HOME GEOGRAPHY

& WORLD RELATIONS

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BOOK I

HOME GEOGRAPHY AND WORLD RELATIONS

By

RICHARD ELWOOD DODGE

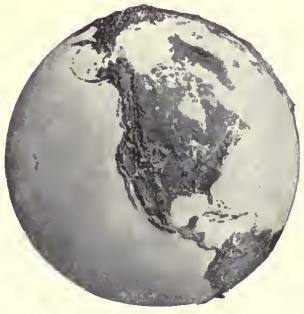
Professor of Geography, Teachers College, Columbia University, New York City; co-editor of The Journal of Geography; and author of "A Reader in Physical Geography for Beginners"

PART I

HOME GEOGRAPHY

PART II

WORLD RELATIONS



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THE PREFACE

THIS volume is intended for beginners in the study of geography. Therefore, in accordance with the best accepted thought in reference to geography-teaching, the volume is devoted largely to Home Geography. In the Home Geography the endeavor has been to write a text that could be readily made personal to every child in the country; a home geography in fact as well as in name. For this reason the point of departure has been the child in his home, and the subjects taken up are successively those that require a broader and more impersonal point of view.

The purpose has been to show the relation of the individual pupil to all parts of his own country, and thereby to emphasize the interdependence of people commercially and industrially. Any treatment of Home Geography must be general in order to make it true for all children in all localities. In the suggestive questions, however, an effort has been made to localize the Home Geography for the individual pupil. He is asked to study his own environment and to explain its geography by the universal facts presented in the text.

Not every geographical fact that can be illustrated in the home environment is legitimate material for a beginner's course, because many facts and relations are so obscure or complex that they cannot be analyzed by beginners. Furthermore, it is impossible to construct a text beginning with the physical features of the environment because there is no one feature that is equally personal and impressive to all pupils in all localities.

Hitherto Home Geography has been treated in an artificial order, and there has been no attempt to relate the facts and principles, so that the pupil passes unconsciously and without a break in continuity of thought from one topic to the next. It is believed that the plan of procedure here followed avoids these difficulties and that any teacher can follow the order of the text without feeling that there are any illogical breaks.

The Home Geography is brought to a climax in a few chapters devoted to the relations of each individual to the world as a whole. From such a view point these relations are really a part of Home Geography, because they are personally important to each child and adult. The interdependence of individuals and of nations is thus emphasized and pupils realize that the trade and industrial relations of their home community are to be found repeated all over the world, and that they are also an epitome of national relations. Thus a deeper human significance is given to the text, and pupils are taught to view sympathetically peoples who at first seem very distant in manner of life as well as place.

The second book will consider the continents largely from the industrial standpoint, and the two books form a complete and logically ordered elementary geography.

Illustrations. The illustrations have been chosen for their teaching and illustrative value, and not as mere pictures. It is hoped that they will be studied equally with the text. The illustrations are largely selected from private collections, and thanks are due the following: Miss Ida E. Robbins, Miss Mary E. Calhoun, Miss Caroline W. Hotchkiss, and Miss Mildred Batchelder, all of *Teachers College, New York City;* Mrs. E. P. Telford, Brooklyn, N. Y.; William Bayliss, Cedar Rapids, Iowa; James B. Carrington, New York City; Doubleday, Page & Co., New York City; The Department of Agriculture, Washington, D. C.; The Detroit Photographic Company, Detroit, Mich.; N. L. Stebbins, Boston, Mass.; William H. Rau, Philadelphia, Pa.; and "The Outlook," New York City.

The thanks of the author are due his colleague, Miss Clara B. Kirchwey, who has given especial attention to the procuring of illustrations and who has prepared the Aids for Teachers and the Suggestions for Collateral Reading.

Critics. In the preparation of this book the author has had the critical assistance of Dr. J. Paul Goode, *Assistant Professor of Geography in the University of Chicago*, and Miss Ellen C. Semple, Louisville, Ky., author of "American History and its Geographic Conditions." Doctor Goode, as an authority on cartography and economic geography, and Miss Semple as an author and a student of anthropogeography, and both as successful teachers, have been able to give very valuable help.

The special critics for the first book are Miss Amy Schüssler, *vice-principal of the Speyer School of Teachers College*, and Miss Anna J. Stone, *principal of Grammar School No. 10, Binghamton, N. Y.* Both of these teachers have to do with pupils whose elementary training has not been of the best, and hence have been able to criticise the general adaptability of the text with especial accuracy.

All the critics have been painstaking and their suggestions have been most helpful and to the point. Special thanks are also due Miss Zonia Baber, of the *School of Education, the University of Chicago;* Miss Elizabeth Smith, of the *Chicago Normal School*, and Superintendent C. N. Kendall, *Indianapolis, Ind.*

Suggestions and detailed criticisms will be welcomed by the author.

RICHARD E. DODGE.

Teachers College, Columbia University, New York City, October, 1903.

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From a photograph by Henry Fuermann

A quiet stream slowly changing the surface of the land.

DODGE'S ELEMENTARY GEOGRAPHY

PART I.

HOME GEOGRAPHY

I. WHAT IS A HOME?

What Home Means. Every child who goes to school spends his days partly in school, partly in playing or working, and partly, as he would say, *at home*. At home he eats, sleeps, plays perhaps with his brothers and sisters, and gets the clothes that keep him warm and dry. Here also he is cared for when sick.

Thus, home to most children means food, clothing, shelter, love, and a good time, and is the one place they like best.

Homes of Birds and Animals. People are not the only dwellers in homes, however, for the small birds and the wild animals have homes, but they do not always live in the same ones all the year. Every country boy knows the homes of certain birds. He probably has watched them build the homes and seen the way they live and the way the old birds feed the young birds and teach them to fly.

FIG. 1. *Blackbirds at home.*

FIG. 2. *A bird home before the young are hatched. Notice the covering of twigs and leaves to conceal the eggs.*

FIG. 3. *A family of prairie dogs and the opening to their home in the ground.*

Some birds, like the robins, the blackbirds (see Fig. 1), and the swallows, come back year after year and build their nests in the same tree, or barn corner, or black, sooty chimney. Until the young birds are able to fly and know how to look out for danger, *the nest is their home*. (See Fig. 2.) Here they are fed and cared for by the father and mother birds just as children are fed and cared for in their homes.

The twig and mud shelters which the muskrats or beavers build, and the holes of the prairie dogs (see Fig. 3) and other

FIG. 4. *A deserted farmhouse. This is not a home because there are no people living in it.*

FIG. 5. *A typical village house in which a family is living. This is a true home.*

animals that burrow in the ground, are homes to them for the same reason that our houses are homes to us.

No matter to what country we go we shall find people living in homes. So, if we can find out why we live in homes, and what we do there, we will be better able to understand other people who do many things that seem strange to us now, but who are busy earning a living in different ways.

Kinds of Homes. An old deserted farmhouse, such as one often sees in the country, is not a home (See Fig. 4.) Neither is an empty city house or a vacant apartment a home. But they would become homes if somebody moved into them.

People are, therefore, a necessary part of every home, and a house is only a place for a family to live in and to make into a home. (See Figs. 5 and 6.)

Everybody lives in some kind of a *house*, to shelter him from the rain, the snow, the cold, and the heat. All houses, however, are not like the wood or brick houses that we know, because some people cannot get wood or bricks, and so have to use something else.

For example, some of the *Indians* of our own country live in houses made of cloth, or skins, or bark, or sometimes of earth and stones. (See Figs. 7 and 8.) Yet this house is the Indian's home. When the house is movable he carries it about with him from place to place.

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FIG. 6. *A mountaineer's home, built of mud, slabs, and rough logs.*

Homes in Far-Away Countries. Some people make their homes in holes dug in the ground, and in the coldest parts of the world the houses are often built of snow and ice. We should think such homes very simple

and rough, but the people who live in them are happy and far more comfortable than would seem possible to us.

These are only a few of the many kinds of houses that are used as homes in the far-away countries of which we shall learn more by and by. (See Figs. 120, 257, 336, and 371.)

In some of the homes we could visit we should find the children dressed in clothes that would look very strange and uncomfortable to us. The children would be playing strange games, and talking a language we could not understand. They would all, however, be living in homes and be eating, sleeping, playing, and learning how to take care of themselves.

FIG. 7. *A house made of skins — an Indian home.*

Suggestions for Review

(1) Name as many things as you can that you do at home. (2) Describe any animal homes you have seen. (3) Watch some birds building a nest in the spring and tell all you can about what they do. (4) Collect some *old* birds' nests if you can and describe them. (5) Describe some homes that you have read about. (6) Collect pictures of different kinds of homes.

II. GROUPS OF HOMES

Village, Town, and City. In some places it is a long way from one house or home to the next, but in many places several families live near together.

If there are only a few houses in a place, we call it a small *village* or *hamlet*. If there are many grouped together, it is a *town*. If there are many hundreds of houses close together in a small area, it is a large town or *city*.

In the United States about one-third of all the people live in large towns or cities.

How Cities Begin. In a small village the homes are often grouped about *four corners* where two roads cross. (See Fig. 9.) People traveling along either road have to pass by the four corners, and so twice as many people pass this point as go along either road. Thus the four corners can be easily reached by many people and is a convenient place for a store, a blacksmith shop, a schoolhouse, a church, a post office, or for any other building that many people need to use.

FIG. 8. *A house made from brush, showing the framework of logs. The brush is laid on the side toward the sun.*

Such a village may be the beginning of a large town; in fact, many of the large towns and cities of the United States have grown from small villages at cross-roads corners.

Reasons Why People Live in Cities. As we walk or drive along any of the roads leading from such a village, we find the houses farther and farther apart and more land about each house. The house is usually near the road, but the land belonging to it extends

FIG. 9. *A cross-roads or "four corners" with homes grouped about it.*

far back from the road. In villages we nearly always find that every house has a small lawn in front and a vegetable or flower garden behind. (See Figs. 5 and 10.)

In large cities there are frequently so many people living on a small piece of land that there is no room for a garden or lawn, although there is usually a small back yard to each house.

In some cities many of the houses are different from those in villages or in the country, being built to hold several families. One house may be four or five or more stories high, and may contain many families living on a piece of ground that would seem small for one family in the country. (See Fig. 11.) In the same way the business blocks are built in stories so that hundreds of people can use one building.

People live close together, as a rule, *because it is more convenient* to be near the stores, the schools, and the post office, and because they can *do business with one another more easily* than they could if they lived far apart.

Suggestions for Review

(1) Do you live in a village, town, or city? (2) How do you know this? (3) Mention all the buildings near your home that are used by many families. (4) Are these buildings close together or are they scattered? (5) Are the buildings in the center of the town you know best higher or lower than those on the edges of the town? (6) How high a building have you seen? (7) How many people lived or worked in it? (8) If you were going to start a store in the country where should you want it placed? (9) Mention some things you have seen growing in a garden or in a city yard. (10) What is the chief reason for the existence of your town or village?

FIG. 10. *A broad street in a town. This town has grown from a hamlet at a cross-roads.*

III. STREETS AND ROADS

The Need of Roads. People need to travel quickly from one place to another, in order not to lose any time in carrying on their business. So the houses in most places are arranged along a street or road which *connects* them. In large villages or towns where all the land must be used, the houses are on streets that cross one another, so as to

leave squares with streets on all sides. (See Figs. 12 and 35.) In such cases the streets are named and the houses numbered, and it is easy to tell where a person lives.

In a newly settled country where the homes are far apart and where there are few people to travel from house to house, there are no broad roads or streets. Instead there are narrow paths or *trails*, sometimes only wide enough for a man on foot or on horseback.

The Roads of Animals. Before the white people came to our country, it was occupied only by the animals and Indians. Animals need roads or paths to get from place to place as much as men do, for they usually get their food in one place and their water in another. (See Figs. 13 and 14.)

In some cities the streets that we now travel over were once only paths made by cows going back and forth to pasture when the city was a small town or village.

FIG. 11. *A tall city building in which many people have their homes.*

FIG. 12. *A plan of the streets, blocks, and squares in the center of a city.*

The herds of buffaloes that formerly lived in great numbers in the central part of the United States, made such deep paths or trails as they traveled back and forth that the trails can be seen now, many years afterward. (See Fig. 14.)

The paths that lead from an ant's nest or from the hole of a groundhog or woodchuck, which can be seen by almost any country boy, are roads to the animals that made them, and are used just as men's roads are.

Branching Roads. Such paths branch a short distance from the home, because all the animals do not want to go to the same place for food.

In large towns, as we have seen, most of the streets are arranged in squares, because all of the land can be used for houses, if the streets are laid out on a regular plan. Farther from the town, however, the roads will branch, just as the cow paths or ant trails do, one branch leading in one direction and the other in another. (See Figs. 13 and 15.)

At the point where the roads divide, which is often called a *corner*, there is usually a guidepost that shows where each road leads to and how far it is to that place.

FIG. 13. *A path made by cattle in passing to and from the river for water. Notice how two paths come together.*

(See Fig. 16.) Such guideposts are conveniences, like the roads themselves, and help people to get from place to place.

Why Roads Should be Well Made. The streets in a large town or city are used by so many people that they are often crowded, and for this reason they need to be wider and better than most country roads and paths. (See Fig. 17.)

Many streets in large towns and cities are covered with material that will wear better than the earth which is used in country roads. Streets that are used by heavy teams are often covered or *paved* with blocks of stone set on end or with bricks. The little cracks between the stones make it easier for horses to get a footing so that they can pull hard.

Streets that are for carriages or bicycles are made as smooth and hard as possible, so that the people riding over them will not be shaken too roughly.

A good road or street is not made flat, but slopes from the middle toward the sides. (See Fig. 18.) This is done so that the rain or melted snow will not run down the middle of the street, but along the sides and out of the way of the horses and carriages. Country roads do not need to be paved because they are not used so much as city roads. They should, however, be made of material that will wear well. (See Fig. 19.)

City Streets. As the running water would wear the city streets, *gutters* are made at the sides to carry off the water, just as we often put gutters on a house to catch the rain from the roof.

If the city street is a long one, openings are made at the corners, and often in the middle of the blocks, for the water to run down under ground into a large pipe or *sewer* that carries it away.

In most towns and cities the *water* which people use in their houses and the *gas* which they use for lighting or heating are carried under the streets in *pipes*. Usually there are places near the edge of the sidewalk where the water can be turned on to put out fires or to clean the street.

Sidewalks. As the streets are often crowded with carriages and horses so that it is not safe for people on foot, a part of the street is divided off for walks, which are made along the sides. These *sidewalks* are often paved with bricks or some other hard

FIG. 14. *A buffalo trail, made by the passing of buffaloes in single file to the stream for water.*

material that will not easily wear out. (See Fig. 17.)

In the country, where the roads are not crowded, children walk to school along the sides of the roads or in paths across the fields, but in a town or city they follow the sidewalks and are supposed to cross the streets only at the corners.

Street Lighting and Cleaning; The Police. In many towns and cities the streets are used a great deal at night, and have to be *lighted*, so that people will not get hurt or lost as they go from house to house after dark.

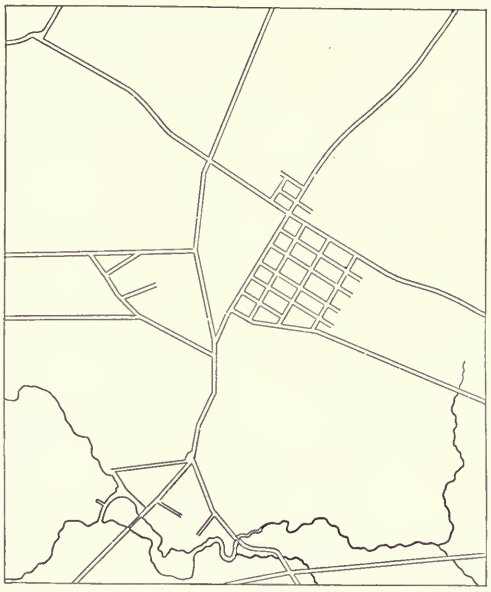

Fig. 15. *Plan of a village showing cross roads, branching roads, and regular arrangement of the village streets.*

If a street is a busy street it has to be kept *clean*. In many cities men known as street cleaners work all day and sometimes all night, sweeping up and carrying away the dirt and rubbish.

Just as there are street cleaners in a city, so there are *policemen* who are in the street to help people, especially when there is an accident, and to keep order.

Cost of Caring for the Streets. It costs a great deal of money to care for streets, because there are many different kinds of things that must be done to keep a street in order.

If every person were obliged to take care of the street and sidewalk in front of his own land or house, he would have little time or money for any other business, and some pieces of street would be good and some bad, so that traveling would be difficult or even dangerous.

Suggestions for Review

(1) Do you live in the city or in the country? (2) On a street or on a road? (3) What is your whole address? (4) Why is it important to know your address? (5) With what is your street or road covered? (6) In what part of it does the rain-water run? (7) Mention anything that is a part of the street you know best, but which has not been spoken of in this book. (8) Study the roads of an ants' nest and make a drawing to show the paths the ants take going back and forth. (9) Watch cows as they go to pasture and see if they follow a path. (10) Watch some ducks or geese going to a pond and describe their route. (11) Why do certain parts of the carpets or floors in your house wear away faster than others? (12) What parts of a street would therefore need the most repair? (13) How is the street about your schoolhouse kept in repair? (14) Describe a path along which you have walked and compare it with a street. (15) Tell about some roadmaking you have seen. (16) Draw a picture showing how a road slopes. (17) Is your street lighted, and if so, how? (18) How can children aid in street cleaning? (19) Why must people drive over street crossings slowly?

Fig. 16. *A guidepost at a country "cross-roads" showing the way to four villages.*

IV. THE NEED FOR GOVERNMENT

Why People Elect Town Officers. It has been found *better* and *cheaper* in all large towns and cities to choose a certain number of men to control all the things that every one must have, such as streets, lights, schools, and parks. Each man in town, who owns any property, gives a certain amount of money each year to help pay for these things. This money is known as his *tax*. The men who have charge of town or city affairs are known as the city or town officers, and form the *government*.

FIG. 17. *A paved city street, showing the broad sidewalks and tall buildings used for stores and offices. A city park is shown at the left.*

In large cities the government is made up of many men, while in small towns there may be but a few men, perhaps only three, chosen to take charge of the government.

The man who is chosen as head of the government of a city or large town is usually known as the *Mayor*.

Town or City Laws. In most places certain of the men who form the government make rules, or *laws*, which all people in the town must obey. These laws may forbid the people to ride bicycles on the sidewalk, or to let their cows or pigs go loose on the street. They may indicate which streets can be used for heavy wagons or for electric cars.

There are so many things that a man cannot do for himself, but which a few men can easily do for all, that a *government is necessary in all places where large numbers of people live.*

Government in the Home. Every child knows about government in his own home, for there are certain *rules* that must be obeyed, just as there are rules or laws in a city or town.

In the home the mother usually cares for the house and sees that the food is cooked and the meals prepared; the father works perhaps away from home at some business, and earns money to pay for the necessary food, clothing, and fuel. Sometimes each child has certain work to do each day which is his part of caring for the home.

The work of the house is divided among the members of the family just as the work of caring for the city was divided among a number of men, each having a special task. Thus a home is a little government, the simplest kind of government there is, and one that every child knows in his every-day life.

The State Government. Just as many people unite in selecting the officers of their home region, so many neighboring places,

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FIG. 18. *A hard, well-paved road. Over such roads heavy loads of cotton and timber are easily drawn. The sloping sides aid in carrying off the surface water.*

covering a large amount of country, unite and form a *state*. The officers elected to form the state government make laws for all the people of all the cities, towns, villages, and smaller country settlements of the state. The state officers meet regularly at some city in the state, which is known as the *capital* city; the building in which they carry on their business is known as the *capitol*. (See Fig. 20.)

The state government fixes by law what a man must do in order to *vote*, that is, to help select town, county, or state officers. State laws also fix the time when certain animals can be hunted and certain fishes caught, and the state government manages many things like prisons, hospitals, and canals, that are useful to all the people in the state.

The chief officer in the state government is known as the *Governor*. The Governor usually lives at the capital city.

The United States Government; The President. All the states of this country choose men to manage the things which every one in the country is interested in. Our country, which is made up of all the states, is called the *United States*. Thus the highest form of government in our country is the United States Government.

Such a government is known as a national or federal government, and the states of the national government form the

FIG. 19. *A good country road made of small stones and gravel.*

FIG. 20. *A state capitol in which the state officers meet to make the laws.*

nation. Consequently whenever the nation is spoken of we mean the United States.

The man chosen by the people once in four years as chief officer of the United States Government is called the *President.* He has many men to work with him, some of whom are chosen or elected by the people, while others are selected by the President and the leading men who assist him.

What the National Government Does. The United States Government manages the Post Office Department, which arranges for the sending of letters to all parts of the country. The Post Office Department is the part of the national government that everybody knows the best, because nearly everybody receives or sends letters. The Post Office Department is, however, but one of very many ways in which the national government serves all the people of our land. Certain other ways in which we are helped by it will be seen when we study the different parts of our own country. The United States Government also manages the business between our national government and other national governments.

Though other national governments may differ from ours in some ways, *governments are all alike in being necessary, because large numbers of people living together need laws to control them and help them.*

Suggestions for Review

(1) What officers are there in some school club you are interested in? (2) What do they do? (3) How are they elected? (4) Mention all the things you know that are managed by your town or city. (5) What is the building called where your town or city officers meet? (6) What would you go to that building for? (7) Find out if there is any form of government in your state not mentioned here. (8) Mention some town or city laws you know about. (9) What punishment would come to you if you disobeyed these laws? (10) Who is the governor of your state? (11) How often is the governor elected? (12) When is election day? (13) Why is election day usually a holiday? (14) Mention some things that your state manages for all the people. (15) Who is the President now? (16) Find out some of the officers he appoints to help him. (17) What other things than the Post Office do you know to be managed by the United States Government? (18) Have you ever seen an officer of the national government? (19) What office does he occupy?

FIG. 21. *A solitary farm situated on a level plain or prairie.*

V. THE SURFACE OF THE LAND

Where Houses are Built. We have seen that houses are necessary for making *homes,* and that roads or streets *connect* houses or different places where people live.

Houses and streets are built on the *surface* of the land, but the way the houses are grouped and the way the streets run varies,

because the surface of the land differs greatly in different places.

Every house has a certain amount of land about it, though in some cases it is very small. On at least two sides of every house, however, there is an open space. This gives a chance for the sunlight to strike the windows, for the air we breathe to move freely, and sometimes room for a garden in which vegetables can be raised, or for a little grass plot which can be used as a playground for children. (See Fig. 5.)

FIG. 22. *A town built on a plain where one can see many miles in every direction. Notice that the roads are straight and level.*

Plains. Every child in going back and forth between his home and the school, the church, or the woods, goes over the land, but the view or *landscape* which he sees is very different in different places.

The path or road which he travels over may be both straight and level in those parts of the country where the land is smooth and even. (See Fig. 22.)

In such regions one can see a long way in all directions, as few heights or *hills* rise above the lower land to shut out the view. Such broad, flat regions are called *plains*, and a large part of the world has a surface that is more or less like a plain. (See Fig. 21.)

On plains the roads and railroads may be straight for miles, which makes it easy to travel in almost any direction. In such places the farms are often very large, sometimes so large that it would take hours to ride around one of them. This makes the homes several miles apart, and people can visit one another very rarely, and they live lonely lives unless they have a telephone to use in talking to their neighbors. (See Figs. 21 and 73.)

Rolling Land; Hills and Valleys. In other places the land surface is uneven and is called *rolling*. (See Fig. 23.) In such a country one can see heights or hills and the lowlands or valleys between. But there are no distant views except now and then from a hilltop.

The hills *slope* down to the valleys. In those parts of the country where there is much snow in winter, children often coast down the slopes of the hills out upon the gentler slopes of the valleys. A coast of a minute or two may be so long that it takes several minutes to walk back.

FIG. 23. *A picture of a rolling country showing a valley and hills.*

People traveling on foot or with a horse try to go on good roads that have gentle slopes.

The roads are built in

FIG. 24. *A railroad built on the low, level land along a narrow river valley.*

the valleys as much as possible (see Fig. 24), but when a road has to go over a hill it ascends where the slopes are gentlest and crosses the hill where the ridge is lowest. Sometimes the road winds back and forth on the side of the hill so as to make climbing easier. Traveling, therefore, over a rolling country is not so easy as over a flat country.

Homes in a Rolling Land. A rolling country is more beautiful than a flat country, and in some ways is better to live in. (See Figs. 21, 23, and 25.)

In many regions there are farms on the lowlands and on the gentle slopes, with pastures for cattle, sheep, and horses on the steeper slopes, and woods and forests on the steepest slopes of all. (See Fig. 26.) The houses and villages are often nestled in the valleys where the wind is not so strong as on the hills. When there are only a few houses in a valley they are usually built on the side that has the morning sun.

At sunrise and sunset the hilltops are often in the sunlight, while the foot of the hills and the lowlands are in deep shadow. Thus the daylight lasts somewhat longer on the hills than in the valleys.

At noon the depths of the valleys are bathed in sunlight, for the sun is then high above the hills.

DEFINITIONS

A plain is a large area of land whose surface is nearly flat.

A hill is a small mass of land rising above the lower land about it.

A rolling region is made up of gentle slopes and contains many hills.

A valley is a lowland which slopes up to higher land on both sides.

Suggestions for Review

(1) Describe the landscape about your own home. (2) What kinds of slopes do you pass over between your school and home? Are they gentle or steep? (3) Describe the view you have seen from the top of a hill. (4) What sort of a slope would you prefer to coast over? (5) Mention and describe some valley you know. (6) How do the roads run in the valley? (7) Where are the houses? (8) Mention something you have seen in a valley that has not been mentioned. (9) Where would you expect to find good farming land? (10) If you were to build a large fire on the Fourth of July where would you place it so as to have it seen for the longest distance? (11) Why is it wiser to plant crops in the lowlands or valleys, and leave the steeper slopes for pastures and forests? (12) Why would pioneers or settlers be apt to follow the course of a valley? (13) Would you prefer to have your home in a rolling country rather than on a plain? Why? (14) Why are houses built on the side that has the morning sun?

FIG. 25. *A town in a well-watered valley, with sloping hills in the distance.*

VI. THE SURFACE OF THE LAND (Continued)

Mountains. In some regions the slopes are very steep and long, and the lowlands are far below the highlands. Such a country is very rough and full of ups and downs, or, as we often say, it is *mountainous*. (See Figs. 26, 27, and 28.)

Mountainous regions are usually made up of a number of different *mountain ranges*, with lower land lying between. Any point in a mountain range rising above its neighbors is known as a mountain *peak*. (See Fig. 29.)

The great highlands we usually call *mountains*. (See Fig. 26.) The slopes may be so steep that nothing, not even a sure-footed goat, can climb them, and the mountain may be so high that people have never been able to reach the top. The most dangerous slopes are those that are almost straight up and down, like a wall, and form a *cliff*. Mountainous regions usually have many cliffs that make mountain-climbing a dangerous sport, only to be enjoyed by those who have little fear of falling.

FIG. 26. *A view of mountains and highland valleys with a mountain range and peak in the distance.*

Highland Regions. Some regions have so rugged or rough a surface that it is impossible to cultivate the soil, and very few people can find places where they can earn a living except perhaps by hunting wild animals or by digging from the ground valuable minerals like silver and gold.

If the highlands are covered with forests, they are usually the homes of wild animals like bears, wild goats, mountain lions, and other animals that are hunted for their flesh or furs. Sometimes a highland region is so rough and the roads or trails are so little used that a stranger does not dare go through the region alone. A traveler has to have a guide who knows the way, for there are no houses or guideposts or other helps to show the right road in any direction. Sometimes there is no road and the traveler must make a path for himself. For these reasons the great highlands contain few people, and many of them are but little known.

Plateaus. If a region is very high and rather flat-topped, it is known as a *plateau*.

In certain parts of our country there are very large and high plateaus, in which are some of the largest and deepest valleys in the world. (See Fig. 191.) Though the valleys are very large, they occupy but a small part of the plateaus as a whole, and hence most of the surface is high and unbroken. The valleys in the plateau region are so deep and have such steep sides that the roads and railroads can follow only certain routes. They cannot be built in any direction, as they usually can be on a plain.

The people of the plateau region travel mostly on horseback, because a horse can travel easily over a country that no wagon could get through. The Indians who live on the plateau region of the United States are famous horsemen. Every one rides, the

FIG. 27. *The broad White Mountain Valley, with Mount Washington and the White Mountain Range in the distance.*

little boys and girls beginning to ride when they are so small that they have to be strapped to their horses to keep them from falling off. (See Fig. 31.)

City and Country Landscapes. In the country a boy or girl can see the slopes of the land and tell whether it is hilly or flat or rugged. Children in large cities and towns are not always so fortunate, for the houses may be so many and so near together that few people can look off to the rolling hills or level fields.

In large cities, the ground of the streets and sidewalks being all paved with stones or bricks, no one can see the earth beneath, except when a trench is dug for a new water or gas pipe or a street railroad.

If the city is built on hilly ground, some of the streets will have slopes, and those that are very steep will not be much used.

In many cities and towns are certain plots of land covered with trees and bushes and rocks, which are kept as *parks*. (See Figs. 12 and 17.) Such parks are delightful playgrounds for children, and places for people to rest in the fresh air.

Before the white men came and built cities and towns wild animals roamed everywhere, and large parts of the country were covered with forests and wild flowers like a park.

Now if it were not for the parks the city child would have no chance to see the plants and wild animals, the beautiful trees and valleys, without going far from home.

In the country every boy knows where to find spring flowers and nut trees and the kind of place the groundhog or rabbit likes best for his home. The boy may not be able to describe his home region in just the words we have used in this book, but he has a little picture of it probably in his mind and knows all about it. He has learned from the land, the flowers, the birds, and the butterflies many things which the city boy has perhaps only read about, if he has heard of them at all.

The country boy, therefore, has many opportunities to learn things and to enjoy himself which are unknown to children living in the crowded streets of a large city.

FIG. 28. *A very mountainous country, with snow-capped ranges and deep valleys.*

FIG. 29. *An upland valley, with mountain peak in the distance.*

Where Cities are Built. Large cities are not usually built where the surface is very rough and the slopes very steep, because people cannot get about easily in such a region. People live on the gentle slopes of the lower land and do not build on the hills until nearly all the lower land is covered. (See Figs. 34 and 35.)

One large city in this country was built on some hills so steep that horses could not pull a load to the top. Much of the land in the city could not be occupied until a man invented a car that could be drawn along by a large wire rope or cable moving in a slot under ground. The hilltops in that city are now covered with houses and the car proved so useful that cable cars are now used in many places where there are very steep hills, and in some cases where the land is level. (See Fig. 39.)

DEFINITIONS

Mountains are very high masses of land with extremely irregular surfaces and many long, steep slopes. Mountains usually occur in ranges, and a point rising above the range as a whole is a mountain peak.

A cliff is a nearly vertical slope that extends for some distance.

A plateau is a very high mass of land with a nearly level surface. It is usually bordered on at least one side by a cliff or series of cliffs.

Suggestions for Review

(1) Describe a mountain you have seen or a picture of a mountain. (2) What grows on the mountain? (3) Did any people live there? (4) Would you expect to find more roads or more paths on a mountain? Why? (5) Find out why bears are good mountain climbers. (6) Why is it very hard work to climb a high mountain? (7) Why is a cliff often a good place to build a fort? (8) What kind of a view would you get from a hill on a plateau? (9) Compare it with a similar view on a plain. (10) Find out something about the life and customs of Indians. (11) Were there ever any Indians in your neighborhood? (12) How do you know? (13) Find out about some very famous Indian. (14) Describe a park that you have visited. (15) If there were hills in the park what grew on them? (16) Were there any streams of water and where were they? (17) Who owns the parks in a city? (18) Why is a cable car safer than a horse or electric car on steep slopes? (19) See if you can find out in what city of this country cable cars were invented.

FIG. 30. *A village in the mountains, situated thousands of feet above sea-level, on the flat plain between high mountain peaks.*

FIG. 31. *An Indian woman with her papoose on horseback.*

VII. THE WATER ON THE SURFACE OF THE LAND

Running Water. We have talked about the *slopes* of the land, the valleys and the hills, but we have not yet mentioned a very important thing that we see in almost any valley, and with which every child likes to play — that is the *running water.*

On any day when it rains, or when the snow is melting, we find the water running over the ground and always *down hill.* If the slope is steep, the water runs fast; if it is gentle, the water runs slowly.

Where two slopes meet there is a *stream,* and as all land surfaces slope, though perhaps very gently, streams are common. We can often see the water running down the roof of a house or into the gutters in a thin sheet, just as it runs down a hillside or along a street. Where two house roofs meet we have a stream, formed by the sheets of water coming together.

Water in Earth and Air. Not all the water, however, that falls to the earth as rain or snow collects in streams. Much of it is retained in the ground, and some of it remains in the air. When we can feel it in the air we say the air is damp, and a handful of earth is usually moist from the water in it.

The earth contains a great amount of water, and men who go down into deep mines always find it there. In most mines pumps have to be kept running all the time to prevent the water from filling the mine to the surface.

Uses of Water. Water is one of the most important things in the world. Every person and every animal must have water to drink frequently, though some animals, like the camel, can get along without it for four or five days at a time.

Plants and trees also use water in very large quantities. They get it from the earth by means of their roots, which often go down a long way into the ground. If plants cannot get all the water they need, they dry up and wither away. Everybody who has a garden or some house plants has to water them frequently.

In some regions where water is not found

FIG. 32. *A city park with a lake. Parks are the playgrounds and breathing places of large cities.*

near the surface of the ground except in the lowland, grass and trees grow only along the streams, and the upper slopes are bare and brown or gray, very different from the green fields most people know.

In some parts of the world it is nearly always dry, and the landscape is very similar in color to our hills in a dry season.

Wells and Springs; City Water. In the country we usually get water for drinking and bathing by digging a hole in the ground, to collect the water that is creeping along under the surface. Such a hole for catching water is a *well.*

Sometimes the water flows to the surface on the side or at the foot of a hill, and we have a *spring.* (See Figs. 36 and 37.)

Springs and wells show us that the earth contains a great amount of water that is slowly moving down hill; all of this is rain water that has soaked into the ground.

In cities and large towns the water that people use in their houses is generally brought in pipes from some country lake or stream, perhaps many miles away. The water is not only carried into the houses by means of pipes, but there are watering troughs and drinking fountains on the streets for the horses and dogs and birds and for people as they pass along.

FIG. 33. *A small village on a plain, showing the tendency to build houses about a few streets.*

FIG. 34. *A city built in a fertile valley. This illustrates how the lowland is built up first.*

Solid Matter in Water. All the water found in streams is not clear and good to drink. The water in many streams is muddy and brown or yellow, especially when it rains often, or very hard. The lack of clearness is due to the small solid particles that are floating along in the water, and which we can easily see if we allow a glass of such muddy water to stand quietly for a few days until it settles. The large amount of matter found on the bottom of the glass shows us that there must be a great quantity of solid material in all the water of a large stream, which is made up of millions of glassfuls of water.

Detritus in Rivers. Every stream is carrying along some solid matter, but in some cases the quantity is so small that the water may seem clear. In swift streams running down steep slopes, the solid matter is usually rolled along the bottom, as sand or pebbles, or even as large boulders. In such streams we often see that the pebbles or boulders

are like the rocks through which the stream flows. This indicates that they have been taken from the land up stream. Streams are carrying something away from the land all the time.

The loosened rock particles, no matter what their size, are called *detritus.* All streams contain water and some detritus.

We call such streams *rivers.* As there is some detritus in every river, the solid material is an important part of the river, though we should remember, of course, that the water is most important, because it is the water that is doing the work of carrying the detritus.

A river then is something like a moving railway train that is carrying passengers or freight, for the river is carrying a load or doing work. The more rock materials there are in the river, the greater the load it is carrying and the more it is doing in removing materials from the land.

The Work of a River. One of the great things that a river does then is to *change the shape of the land,* for it is impossible, of course, to remove materials continually from any region and not change its appearance. (See Figs. 35 and 41.)

The best place to see a stream at work and to study the ways it gets its load is in a small *gully* which is being made in a clay bank, or a plowed field, or even in a street gutter after a rainstorm.

In such a gully we can see the water going down the steep slopes and forming a larger stream at the bottom. We can also see the rock particles sliding and tumbling down to the lowest place, where they are seized by the stream and started on their long journey down the river. (See Fig. 41.)

As the materials are removed the

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FIG. 35. *A mountain-side showing the deep ravines and gullies made by streams. The city is built upon the plain made from the detritus.*

FIG. 36. *A man drinking at a spring in a desert. Notice the absence of grass and trees.*

FIG. 37. *A spring at the foot of a cliff. The water comes to the surface by a crevice in a small hollow.*

FIG. 38. *A hole made by the action of water. Stones and pebbles caught by the water are rolled round and round, gradually wearing away the rock.*

gully grows wider and perhaps longer, and thus the shape of the land is constantly changed. The work of the little gutter stream is like the work of all the rivers of the world. The present shape of all valleys, whether they are small or large, is due chiefly to the streams working in them.

The heights left in the valleys or between valleys by the running water and not carried away are *hills*, or sometimes mountains.

The hills, the mountains, and the valleys then owe their shape largely to the work of water.

We have seen that valleys contain most of the large *cities*, *towns*, and many of the great *farms* of a country. They are also the best places for *wagon roads* and *railroads*.

A large valley, such as is found in the plateau region of the United States, is like the gully in the clay bank, only *very many times larger and deeper*.

FIG. 39. *A cable line up a steep hill.*

DEFINITIONS

A spring is formed where any quantity of underground water appears at the surface.

A well is an opening dug into the earth, through which the underground water is brought to the surface.

A river is a stream of water carrying detritus and moving through the land.

Suggestions for Review

(1) Watch a stream of water in a street and describe carefully what it does. (2) Find out about some plant that has a long water-seeking root. (3) Pull up a number of weeds and study their roots to see how they are arranged for getting food. (4) Study the roots of the trees in your neighborhood and tell where they get their water. (5) Why is a street sometimes muddy and sometimes dusty? (6) Why are city streets often sprinkled? (7) What vegetables or fruits do you know that are full of water? (8) Where did they get the water? (9) Mention

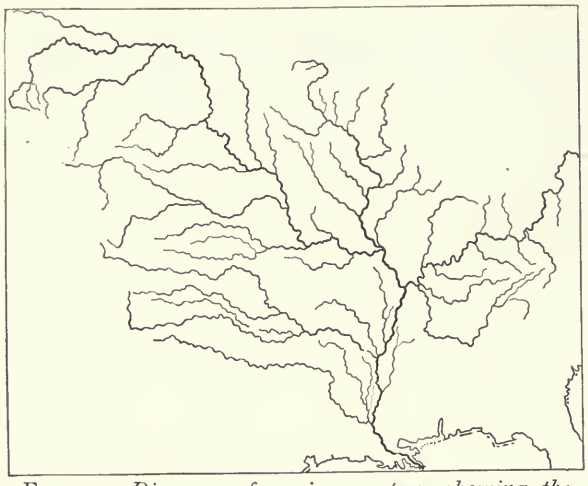

FIG. 40. *Diagram of a river system, showing the many sources, the larger branches, and the large extent of territory drained.*

some uses for springs in a forest. (10) Describe a spring that you have seen. (11) Why do not the people in cities get water from wells? (12) Get a glass of water from a stream and let it settle. (13) What size are the particles left on the bottom of the glass? (14) Find a pebble from a brook or stream and describe its shape. (15) Can you explain the shape? (16) Find some large pebbles that are like the rocks on the hills up stream. (17) Tell the history of such a pebble.

VIII. RIVERS

River Systems and River Basins. The small streams flowing down the steep slopes join others as they flow along and form a larger stream, just as the side tracks in a railway yard are all connected with the track of the main line.

The small streams usually run into the large streams very much as the veins in a maple or oak leaf run toward the stem. Thus a river usually has a series of branching valleys with ridges separating one valley from the next. (See Figs. 40 and 42.)

Each small stream is a *branch* or *tributary* of the large stream. Each tributary is carrying down water and detritus to the *main stream*, and is *making a valley*.

All the small and large streams forming one large river make up a *river system*, and all the land which is drained by the main stream is a *river basin*.

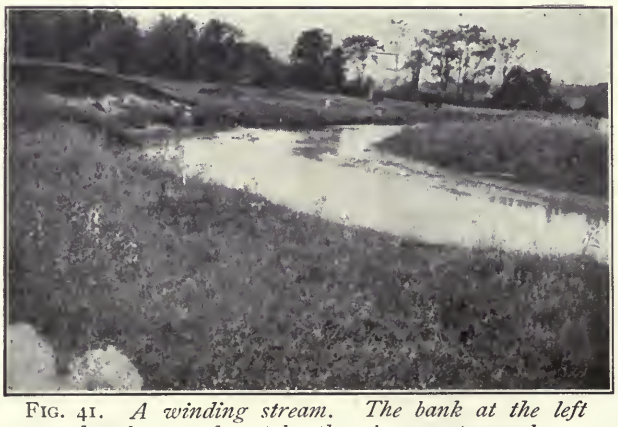

FIG. 41. *A winding stream. The bank at the left has been undercut by the river water and the material has been carried away.*

FIG. 42. *A view of the ridges or divides, showing how various river systems are separated.*

Somewhere between one valley and the next, and often on top of the ridge between, is a place from which the land slopes in two directions. The rain falling on such a ridge would flow down the two slopes, part going to one stream and part to another.

This dividing line between one stream and the next is known as a *divide*. The main divides are those which separate one river system from another. In any river basin there are also tributary divides, which are found on the ridges, separating branches of the same river. (See Fig. 42.)

Sometimes a valley contains nothing but a dry stream bed, yet it is a valley, and we know it has been formed like other valleys

FIG. 43. *A mill supplied with water power by a dam. The picture shows how the level of the water in the river is raised.*

by running water, because it is like other valleys in every respect.

Lakes and Ponds. If we follow down some streams we reach a place where the water becomes very broad and perhaps deep, and seems to be standing still. Such a broad area of water may have several streams flowing into it, but the water flows out only at the lowest point or *outlet*. We call such a body of water a *lake* if it is large, and a *pond* if it is small.

Lakes are found wherever there is a *dam* or *obstruction* in the river's course that causes the water to rise behind the dam. (See Fig. 46.) The land about the lake forms a dam, and keeps the water from running away until it has accumulated behind the dam and reached the top. Any boy who has made water dams knows how lakes are made, and how quickly they may flow away or be *drained*.

In certain parts of our country great numbers of lakes are found, varying in size from little ponds, just big enough to sail toy boats in, to lakes so large that it takes many hours to cross them on a fast steamboat. (See Fig. 44.)

Uses of Lakes. Lakes are very useful. The large ones make travel through the country easy, because one can travel over the level water more easily and quickly than over the rolling land. The edges of a lake where the wind brings cool air ashore make pleasant places for people to live during the summer.

Lakes also furnish water to use in large cities, and they keep water from running away from a region too fast after a storm, because the water has to pass through a small outlet and cannot all go at once.

Lakes rise in height quickly when an unusual amount of water runs into them and they fall slowly as the water runs away.

Sometimes lakes are made by men by building a dam across a large stream. (See Fig. 43.) The water from such a made lake is often used to turn wheels in *mills*, or to supply a city or town with drinking water. (See Figs. 45 and 46.) It may also be turned into ditches and carried down over the land, where it waters or *irrigates* the plants, vegetables, and fruit trees. (See Fig. 47.)

Irrigation is very common in those parts of the world where it rains little during the summer, and where the plants and crops would dry up if they were not watered frequently.

FIG. 44. *A wide plain containing a series of lakes. Notice the snow on the mountains beyond.*

FIG. 45. *An old water wheel at a mill.*

Swamps. Where lakes have become filled with detritus and vegetation, the ground is soft and wet. Such places are known as *swamps*. Swamps often occur also beside streams or along the shores of large bodies of water. Swamps are usually waste land because they are too wet and soft to be used for farming. Where they occur in great numbers, as they do in several parts of the United States, they make cross-country traveling difficult.

Rapids and Waterfalls. At the outlet of a lake the slope of the river bed is usually somewhat steep and the water runs rapidly or tumbles along much like a bouncing ball. Such swift stretches in streams are known as *rapids*. (See Figs. 45 and 48.) If the slope is very steep, the water actually leaps and forms a *waterfall*. The water may leap only a few feet, when we call it a *cascade* (see Fig. 55), or it may fall several hundred feet. Waterfalls are always beautiful, especially where the amount of water is very great, or where the water breaks into spray as it leaps through the air. (See Fig. 48.)

A boy who makes a water dam usually has a fall at the lower end, and it is very easy to make a small wheel that the water will turn and perhaps to make that wheel turn something else. Such a little water wheel shows us clearly why large water wheels and mills are built at so many large waterfalls.

Small brooks on farms are often made to turn water wheels, and these wheels to turn machines that saw wood, or cut up hay for cattle, or churn milk to make butter, or perform other useful work.

FIG. 46. *A dam built at one end of a valley so as to make a reservoir to supply a distant city with water.*

DEFINITIONS

A tributary or branch is a small stream that pours its water and detritus into a large stream.

A river system is made up of all the streams that finally join in one main stream.

A river basin includes all the land that is drained by one stream.

A divide is the bordering line between two river basins, from which the land slopes in either direction toward a river.

A lake is a body of water held up-stream by a dam or natural rock barrier.

A rapid is formed by the waters of a river running swiftly along a steep slope.

A waterfall is formed where the water of a stream leaps down a slope that is nearly vertical.

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FIG. 47. *An irrigating ditch. Water is turned into the many gullies from a large brook or river.*

Suggestions for Review

(1) Describe the arrangement of streams in some river valley you know. (2) Watch the rain running from a house roof, and locate the divide. (3) If two roofs should slope toward each other, where would the rain water go? (4) If you could not tell by your eye which way a street sloped, how could you find out? (5) Suggest some uses of lakes that have not been mentioned. (6) If you lived by a small lake, what would you play in summer? In winter? (7) Can you suggest any other reasons why waterfalls are an advantage to people? (8) Can you mention any famous waterfall? (9) If you were sailing down a stream, what would you have to do when you came to a waterfall? (10) Find out how beavers sometimes build dams across streams. (11) Describe a swamp or swampy place that you have seen. (12) If you ever built a dam, tell how it was made. (13) What is the largest waterfall you have ever seen? (14) For what are waterfalls sometimes used?

IX. RIVERS (Continued)

Deltas. If we should go to a mud puddle after it is dried up we should find that it had been partly filled by the detritus brought down by the little river. At the upper end, where the stream entered the puddle, the detritus left by the water would form a flat plain with very steep edges. Such a little plain made of rock materials dropped by water is known as a *delta*. (See Figs. 50 and 51.)

Deltas are usually found wherever a stream flows into a quiet body of water, and so loses the power necessary for carrying its load. The delta may be built even above the surface of the body of water. Then the main stream bringing the detritus would branch as our finger bones branch from our wrists. Each little stream would flow toward a different point on the edge of the delta, and would be carrying a part of the water and detritus of the main stream.

FIG. 48. *Rapids in a swift mountain stream.*

FIG. 49. *A series of mills supplied with water power by a dam, a part of which is to be seen at the left.*

In fact it is because the streams are arranged in this way that we name such a new-made plain a delta. (See Fig. 50.)

If we should follow down to the end of many of the largest rivers of the world we should find them building great deltas at the edge of the largest body of water in the world, known as the ocean. Some of these deltas are large enough for the homes and farms of thousands of people.

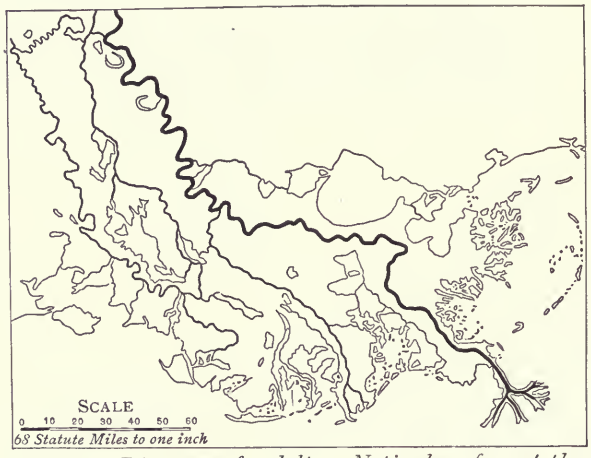

FIG. 50. *Diagram of a delta. Notice how far up the river the distributing outlets begin.*

Uses of Deltas. All rivers run toward the ocean, but not all reach it, because some dry up or disappear on the way. Not all rivers that flow into the ocean make deltas, but where there are deltas the land is gradually extending out into the water as the delta grows.

Deltas are made of the very finest of rock particles, and hence are usually excellent for farms, because the fine rock particles make good soil for plants.

As we shall see later, however, deltas are sometimes found in parts of the world where it is too cold or too dry for farming to be carried on, so all deltas are not equally useful.

Flood and Alluvial Plains. If we go to the lower part of a river valley we shall usually find that the water no longer leaps or hurries along its course, and that the steepest slopes of the valley are far back from the stream. Between the river and the steep slopes will be found a flat, gently sloping plain.

Such a plain is made, like the delta, of fine rock particles that have been brought down by the river or washed from the steeper walls of the valley.

Plains made in this way are known as *alluvial plains.*

Alluvial plains, like the deltas, make excellent farming land, because they are made of very fine soil. A valley in which such a plain is found has been more or less filled up by the gradual building of the alluvial plain, and hence is not as deep as it once

FIG. 51. *A small delta made by a brook flowing into a small pool.*

FIG. 52. *A winding river. Notice how the bank has been worn away on the right, and built up on the left, where the water flows more slowly.*

was. (See Figs. 53 and 56.) Some alluvial plains are covered by water after very heavy rains, or in the spring when the streams are flooded with water from the melting snow and heavy spring storms. If the alluvial plain is flooded at such times, it is called a *flood plain*. (See Fig. 54.)

The Winding of a River. A river flows rapidly while it is near its headwaters where the slopes are steep, and where it follows a fairly straight course which it cuts for itself, but through an alluvial plain the river flows very slowly and quietly. (See Fig. 56.) The slope is so gentle that the water finds it easier to go around any obstacle than to push it out of the way. Even a fallen tree will often turn a river to one side. (See Fig. 63.)

When a river has once begun to swing it usually grows more and more winding, and a river in an alluvial plain winds and twists about in a snake-like course. (See Fig. 56.)

Traveling by water along such a winding river is very slow, because one has to travel so far between two points that may be close together. In spite, however, of the slowness of traveling, the large rivers of the world, many of which are very crooked, are much used by boats that carry passengers and freight up and down.

Summary. We have found that water is useful in many ways. The water that falls to the earth from the sky starts down hill toward the ocean. Some of it runs on the surface of the ground in rivers, making valleys and leaving hills, turning mills, watering farms, and doing many kinds of work as it goes along. Some of it creeps along under the surface, making the earth moist and feeding the plants, and perhaps appearing again at the surface in a spring, and then running on to a river.

We have also seen that river valleys are very important, because they furnish the best places for people to live in; that people can travel more quickly and easily along river valleys than over the mountains and

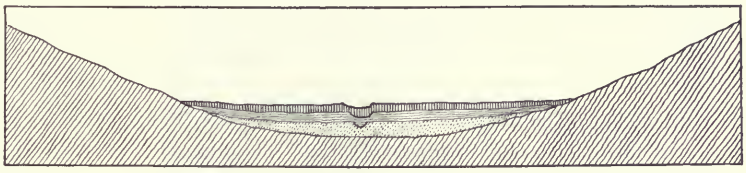

FIG. 53. *A diagram showing the filling in of a river valley by detritus. The river bottom has been gradually built up.*

FIG. 54. *A flood. The river has overflowed its banks and covered the lowlands. This flooding deposits mud and sand, thus building up the river valley.*

FIG. 55. *A cascade or mountain torrent seeking a level.*

ridges. Rivers are continually changing the shape of their valleys by taking rock materials from one place, by cutting their valleys deeper and broader, and by leaving detritus in other places, making deltas and flood plains. If we should follow down a river from any one of the little headwater tributaries to its end or *mouth* in the ocean, we should always be going down hill, except where there was a lake, held back by a dam, where the water surface would be so nearly level that no one would know there was any slope.

Hence we say that *all water tries to run down hill toward the ocean,* and most rivers reach the ocean, though a few do not.

DEFINITIONS

A delta is a flat plain of fine detritus formed where a river flows into a body of quiet water.

An alluvial plain is a flat plain of fine detritus left by a river along its sides where its slope is gentle.

A flood plain is that portion of an alluvial plain that is covered by the river at times of flood.

Suggestions for Review

(1) Describe a delta that you have seen in a puddle formed during a rain, and if possible watch such a delta grow during a storm. (2) Find out something about a very famous flood plain that is flooded each year. (3) Draw a straight line between two points, and then draw a very curved and winding line between the same points, and compare their lengths. (4) Study a winding stream and find out where the water is deepest and where most shallow. (5) Mention some things that might change the course of a river in an alluvial plain. (6) Write a short story describing the work of an imaginary stream.

X. SOILS

Rock Detritus. We have already spoken of the little rock particles that are being carried along by the river. These particles are

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FIG. 56. *A winding, snake-like river. In the low valleys rivers flow very slowly. Compare with Fig. 55.*

FIG. 57. *A mass of solid rock exposed by digging and blasting, showing the layers of soil above.*

some of the small pieces of loosened rock which may be found covering the surface of the earth almost everywhere, and which have accumulated in some places until they form very deep layers.

Beneath this loose detritus there is always *solid rock*, but it may be many feet under ground. (See Figs. 57 and 58.) If the solid rock can be seen at the surface, we speak of it as a *ledge*. (See Fig. 59.) Large loose pieces of solid rock we call *boulders*. (See Fig. 37.)

Weathering of Rock. The detritus that we see, the particles of which may be so small that we can pick up thousands in one handful, have all been broken off from the solid rock in one way and another.

When a deep hole is dug in the ground we can often see that the particles on top are fine, those just below coarse, and increasing in size until the solid rock is reached. (See Fig. 57.)

Rocks everywhere are broken up and loosened by being exposed to the heat, the cold and the wet of the weather, and we speak of these changes as due to *weathering*. (See Figs. 60, 61, and 62.)

Every one knows how a piece of iron which is left exposed to the weather soon rusts and breaks up into little pieces. Many of us have seen the shingles or boards of a new house turn gray from the weather. Rusting is one kind of weathering, and helps to break up certain kinds of rocks.

FIG. 59. *A ledge. The loose earth has been removed from the steep slopes, while it remains on the gentle slopes.*

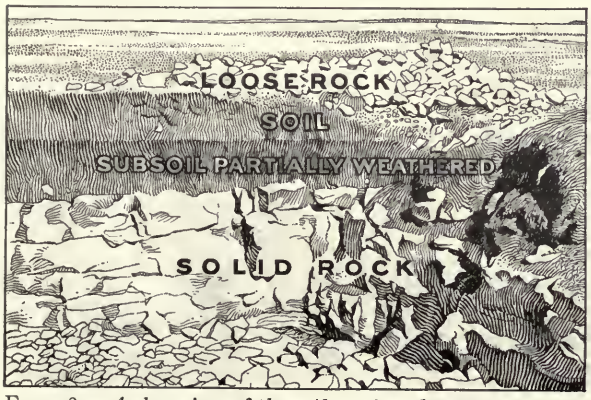


FIG. 58. *A drawing of the soil section shown in Fig. 57, with loose rock, soil, and solid rock sections indicated.*

It is rusting and weathering also that color rock particles, so that the surface of the land or the water in the rivers is made yellow or reddish brown.

The freezing of water in cracks in the rocks also breaks the rocks up, just as a water pipe or pitcher is often broken by water freezing in it.

What Soil Is. The upper and finer portions of the loosened rock particles will usually grow plants and make what is

known as *soil*. Soil is therefore made mostly from rock, although all good soil contains a certain amount of decayed plant materials. The leaves which decay after they fall from the trees each autumn are mixed with the soil and make it rich.

Soil-making is going on all the time, for weathering is constantly taking place everywhere. *Anything that will break up the rocks and make the particles fine is a good soil-maker.* (See Fig. 63.)

The worms and other animals that tunnel through the ground are good soil-makers, for the water follows the tunnels through the earth and thus reaches the soil particles more quickly. The farmer plows and harrows to break up the earth and stir the soil so that the water can soak into it. Any one who raises plants in pots in a greenhouse or window-garden is continually helping the soil-making by stirring up the earth to keep it loose and make the plants grow more rapidly.

FIG. 60. *A profile on the side of a cliff due to weathering.*

The Soil on Slopes. All of the good soil in the world, however, will not raise good crops, because some of the slopes on which the soil rests are so steep that the soil will not stay in place, but slips down as fast as it is formed. (See Fig. 64.) On such slopes the soil is always very thin. (See Fig. 59.)

Even if slopes retain the soil as it is formed, they cannot always be cultivated because people cannot easily get at the place to plow and harrow and till it. Hence the thin soil of steep slopes is generally left for trees or grass. (See Fig. 26.) Where the soil is deep and loose, the running water often cuts deep gullies and wears away a great quantity of material. A smooth slope may be cut up into a series of deep gullies in a few hours during a heavy storm, and a crop planted on such a slope may easily be all washed away.

Where the slopes are very steep they may be bare except for moss such as makes the great loose rocks of the fields in certain parts of our country look gray; or trees may be growing, each little tree getting a footing where it can in a crevice of a rock. (See Fig. 60.)

It is only the gentler slopes that are used for the growing of crops, and we do not find large farms and planted fields on very steep hillsides.

Terraces. In some regions where it is necessary to till the steep slopes, they are made into a series of nearly level steps, like stairs, with steep edges. These steps are known as *terraces*, and on the gentler slopes of the tops of the terraces the farmer plants his crops.

The terraces keep the water which falls

FIG. 61. *A mesa. This is the remnant of a much larger mass of rock now weathered away.*

FIG. 62. *Rock "pinnacles" exposed by the weathering of the surrounding earth and rock.*

FIG. 63. *A tree washed out by the erosion of water. When the stream is flooded the rock and soil particles will be carried away.*

in rain from running swiftly down the hill, cutting deep gullies, and thus carrying away the crops after they have been planted, as often happens in fields where the slopes are steep and the soil deep.

Sometimes also water is brought along the tops of the terraces from some near-by stream or lake so that the plants are watered and fed during a dry season, or, as we say, the soil is *irrigated*. (See Fig. 185.)

Fertile and Barren Soils. In some parts of the world there are very deep and rich soils, on which, however, practically nothing grows because the land is too cold or the region is too dry.

Those soils that raise good crops we speak of as *fertile*. Others are called *infertile* or *barren*. (See Fig. 65.)

On almost any farm there are certain fields that have better soils than others. Some kinds of rocks do not decay or weather into as good soil as others, and thus there are in some places great areas that are barren. Any farmer boy knows that a sandy soil is not as fertile as is a dark, rich, loamy soil. He knows, also, that he can raise the best hay and potatoes on a loamy soil, and the best watermelons on a sandy soil.

The Importance of Soils. The soils of the world made from the solid rock beneath are, together with the water and the air, absolutely necessary in order that plants, animals, and men may live, for the soil gives us most of our food.

Those of us who live in large cities, where we can see but very little of the soil or the rocks, may find it hard to believe this. Yet the milk we drink comes from cows that live on grass grown in the soil; the vegetables we eat are raised in the soil, and the meat comes from cattle or sheep or hogs that live on grass grown in the soil. The same may be said for the wheat that is made into flour, the tea, the coffee, the sugar, and most of the other things we have on the table every day.

The clothes we wear also come from the soil — the cotton from the cotton plant grown in the soil, and the wool from sheep

FIG. 64. *A landslide. The slope was so steep that the soil would not cling to it.*

FIG. 65. *A barren area. The soil here is very dry, and only the most hardy shrubs can live.*

which depend on the soil for their food. Even the leather of our shoes comes from the soil because it is made from the skins of animals which depend on grass for food. The farmer's work, therefore, is the most important, because we get from him the materials for our *food* and *clothing*.

DEFINITION

Soil is a mixture of decayed rock and vegetable matter in which plants will grow.

Suggestions for Review

(1) Put a new shingle or board out in the weather for several weeks and describe what changes take place. (2) Put a new iron nail (not a wire nail) in some damp salt and describe what takes place. (3) Why should a farmer put his tools into a building every night? (4) Why is it necessary to keep the iron work on vessels well painted? (5) Mention some animals that stir up the soil. (6) Turn some water on a hard baked soil and on some stirred soil, and see in which case the water disappears the more quickly. (7) Why do farmers frequently plow in the fall? (8) Plant some peas or nasturtiums in a rich, loamy soil and others in sandy soil, and compare the rate of growth. (9) Why do farmers often raise a crop of clover and then plow it into the soil? (10) Why does a farmer hoe and cultivate crops until they are full grown? (11) Where would you go to get soil for a window garden? (12) Break a pebble to see if the inside looks like the outside. (13) Describe and explain any difference you may see.

XI. THE ATMOSPHERE

How We Know There is Air. The atmosphere or air is about us everywhere. We cannot see it, yet we know of its presence because when it is in motion it blows against our faces and moves the trees and grasses.

On a windy dry day the air is full of dust, and if we look at the sunlight streaming into a partly dark room through a small hole, we can see the little specks of dust dancing in the air. In the fall we can see the seeds of many of our common weeds blown along in the air, which must have weight because it bears things up.

If you blow against a sheet of paper it will move because the air has been pushed against it. Hang out a flag and it flaps and snaps as it is hit by the air moving past it.

FIG. 66. *Football, the American game, played in the bracing autumn days.*

The Wind and Its Uses. When the air is moving along so that we can feel it on our faces we call it the *wind*. The wind can be used in many more ways than quiet air can. The wind turns windmills to pump water or to run machinery in mills (see Fig. 67); it blows against a boy's kite and makes it rise in the air.

The wind may even blow so hard that it does much damage, as when it blows down trees and rips shingles and boards off houses. Sometimes it is so strong that a man can hardly walk against it, and it has been known to blow a railroad train off the track.

The wind is of the most importance to the sailor, however, for he depends upon it to blow his vessel along. When the wind stops, as it does sometimes, the sailing vessel is helpless because there is nothing to move it.

Air Necessary to Life. Most of us forget about the air unless it is moving briskly. Yet quiet air is of constant use to us; in fact necessary, because we breathe it. We eat frequently, we have to drink several times a day, but we have to breathe all the time. Even when we are asleep our chests rise and fall with our breathing.

Breathing is nothing but taking air into the part of our bodies known as our lungs and sending it out again. The air purifies our blood as it passes through the lungs, and we could not live if the supply of pure air were shut off for even a few minutes.

Air is *more necessary than food and drink*, for we can go without the latter for many hours at a time.

The Weather. The air can be cold or warm, wet or dry, quiet or moving, and we describe the conditions at any time by describing the *weather*. We can very easily tell whether the air is cold or warm. It is not always easy, however, to describe some of the other features of the weather.

FIG. 67. *A windmill used for pumping water to supply a farm.*

If the weather is cold we try to warm the air of our houses. We usually do this by a stove or furnace that sends its warmth out freely to the neighboring air.

In some parts of our country, houses are warmed by fireplaces, but in the colder regions stoves or furnaces, with steam or hot water pipes, have been found more satisfactory.

Outdoors the air gets heat from the sun. In the daytime, therefore, the air is usually warmer than at night when the sun is not shining.

FIG. 68. *Fog forming over a lake. The vapor as it rises from the water is cooled in the air and becomes visible as fog.*

Moisture in the Air. The air gets moist or wet by taking in what we know as *vapor*, which is formed when water is warmed or heated.

Everybody knows that what we call "steam" comes from the mouth of a teakettle when the water in it is boiling. Close to the mouth, however, nothing can be seen, and the steam only appears a little way off. The space between the steam and the kettle is full of vapor which we cannot see.

The steam is vapor that has cooled into little drops in the air. When a railway engine starts from a station we can see the steam and hear its hissing noise. (See Figs. 86 and 94.) If we could look inside the engine where the steam is made it would look as if there were nothing there. It would be full of vapor, however.

Fog and Clouds. Vapor is constantly rising from all damp surfaces and going into the air. Warm air makes water change into vapor, or *evaporate*, faster than cool air. Often on a cool summer night we can see the vapor that has risen and cooled or *condensed* into drops over a lake or swamp. (See Fig. 68.)

In the cooler seasons the moisture in the

FIG. 69. *A typical scene on an ocean beach in the summer time.*

air is often frozen into small crystals of ice, known as *frost*. In the summer the moisture which is evaporated from the ground is often chilled by the night air and condensed into small drops of water known as *dew*. It is the dew that makes the grass wet on summer mornings.

Fog and clouds are only chilled water vapor floating in the air. Sometimes the clouds get so heavy and black with moisture that the moisture has to fall. Then we have *rain* or, if it is very cold, *snow*. (See Fig. 71.)

What Becomes of the Rain. The water which is evaporated from the lakes and the ocean is carried along in the air by the wind and finally falls again. Some of it falls into the ocean, some of it falls on the land and helps keep the rivers and lakes full, and feeds the plants as it creeps along underground.

We have already seen that the running water on the land is always moving down toward the sea. Thus, much of the water finally gets back to the ocean, from which the larger part of it was taken by evaporation.

Kinds of Weather. We call our weather *fair* or *clear* if the moisture in the air does not hide the sun, *cloudy* if the sun is clouded over, and *stormy* if it rains or snows.

Most clouds are very close to the surface of the earth, and above the clouds the sky is clear and the sun or stars are shining. Sometimes one can climb a mountain and be in clear weather with the clouds all below him.

Our pleasantest fair weather comes in the fall, or autumn, or in the early summer. We then have many warm, comfortable days with perhaps a little wind, and with a beautiful, clear blue sky. Such days make one feel full of life and ready to do anything. These are the days for long walks through the woods to gather wild flowers or nuts, and for football. (See Fig. 66.) They are what we call *bracing* days because they make us feel so full of energy.

Summer Fair Weather. In the summer our fair weather is usually hot or warm, and the sky is not so clear as it is on fair days in the fall. In fact it is often thick and hazy, and looks bluish as if it were full of smoke. In summer there is frequently no wind at all, and the weather makes us feel very uncomfortable.

If the day is very moist, but yet not moist enough to rain, we do not feel like working very hard. Everything feels damp, and postage stamps get sticky. Our clothes cling

FIG. 70. *Skating on one of the lakes in a large city park.*

FIG. 71. *Trees weighted down after a heavy snowstorm.*

to us and we try to find some way of getting cool. These are the days to go in swimming. (See Fig. 69.)

Very hot, moist days are the most uncomfortable days we have, and they often cause much discomfort and sickness. People get overheated, animals become quiet, cows and sheep lie down in the shade in the pastures instead of eating (see Fig. 76), and plants wilt and dry up so that the harvest is poor.

The other kind of fair weather which we have in summer is when it is very hot and dry with no wind and no sign of rain. Such weather is very bad for all crops, because they cannot get water enough to live. That portion of our country in which the largest number of people live has very little such weather.

Winter Fair Weather. In the winter our fair weather is as different as it can be from that of the summer. In the northern part of our country it is usually cold, and the sky is beautifully clear, especially at night, when the stars are so bright that the night is light without a moon. If there is a wind, it is often very strong and blows the cold into the houses, so that it is hard to keep warm. Sheep and cattle that are not under cover huddle together in the sunshine in some sheltered place.

In a large part of the United States we have many such days in the winter, and if there are several together we say it is a *cold snap.*

On the coldest and fairest days of the winter there is often no wind. The air is quiet and we have a *calm.* These are the days when the ice on the ponds and rivers as well as the ground cracks because it is so cold, just as a piece of iron may break as it shrinks in size when it gets cold. It is on such days in the northern part of the United States that the skating is usually the best, unless the ice is covered too deeply with snow. (See Fig. 70.)

DEFINITIONS

Wind is air moving horizontally.

Weather is the condition of the air in a place at any moment.

Vapor is invisible moisture in the air.

FIG. 72. *A planting scene on a large farm on the western prairies. Hundreds of men are often employed on a single farm during the planting and harvesting seasons.*

FIG. 73. *Reaping and binding the grain by machinery on a large western farm. These reapers do the work of five men in one-half the time.*

Suggestions for Review

(1) Find out some uses of the wind that have not been mentioned. (2) Describe some cases where the wind has been harmful. (3) Open a window in a warm room and describe what happens to the air. (4) Describe the weather today. (5) What happens when wet clothes are hung in the air to dry? (6) Why is it that clothes sometimes will not dry, though it is not raining? (7) On what kind of a day do clothes dry best? (8) Wet your hand and blow on it. What happens? (9) What does this tell you about the danger of wearing wet clothes on a cold day? (10) Why is there moisture on the windows of a laundry on a cold day? (11) What do we mean when we say we can see the horses' breath? (12) What season of the year do you like best, and why? (13) Mention all the ways you can by which you keep warm in winter. (14) Watch the smoke from a chimney on a calm winter day and tell how it rises. (15) How can you tell that there is moisture in the air even when it is not raining?

XII. THE ATMOSPHERE (Continued)

Spring Storms. We shall find that there are many kinds of stormy weather during a year, just as we have seen that there are many kinds of fair weather.

In the spring we often have a great deal of cloudy weather, and many rains lasting two or three days. Sometimes it rains gently without much wind, and then the country boy knows it is good weather to go a-fishing. If the wind blows, as it often does, the storm may be very severe. Then no one goes out of doors if he can help it.

Such rains come in the early spring when the grass and trees and flowers are beginning to grow. The rain is then very helpful because it makes the plants grow.

There are many days in the spring when we get several short, heavy rains in one day, and we say it is a day of *showers*. On such days it looks as if it would be fair every minute, and yet it is best to carry an umbrella.

Summer Storms. In the summer we usually have few long storms. We have many heavy rains, perhaps with thunder and lightning and much wind. These storms often give us a great deal of rainfall in a short time, so that the streets and gutters are full of water, and crops are washed out on the hillsides. Grain and grass and other crops are frequently beaten flat and greatly damaged. Sometimes during storms some of the water falls as solid pieces of ice, or *hailstones*. These hailstones do a great deal of damage, as they make holes in the leaves

FIG. 74. *Plowing on a small farm. In a rolling or hilly country the work cannot be done by big machines as on the level western prairies.*

of the plants and sometimes cut the vegetation all to pieces.

Ice Storms. In the fall and in the winter, in the northern part of the United States, when it is too warm to snow, we often have heavy rainstorms that are very cold. The wind may blow hard and the water may freeze as it falls, so that the trees and the telephone poles, the streets and sidewalks are covered with a thin layer of ice. Then men and horses find it hard to walk because it is so slippery.

The little birds which stay in the north during the winter can scarcely get any food because the seeds are all covered with ice. Telegraph and telephone wires break down from the weight of ice, causing a great deal of trouble. But if it suddenly clears away,

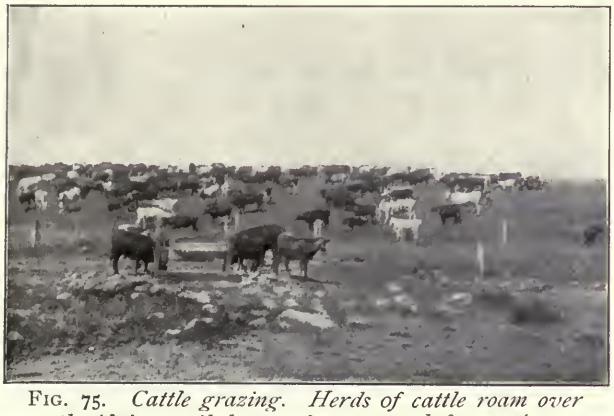


FIG. 75. *Cattle grazing. Herds of cattle roam over the plains until they are large enough for market.*

everything looks very beautiful, shining in the bright sunlight.

Snowstorms. Snowstorms come in the winter, and are most frequent and severe in the northern part of the United States. If the air is quiet and it is not too cold, the snow comes floating down in large feathery flakes which are very pretty. If we look closely at any flake we find it is made up of many different parts that are very beautiful in shape, and which we call crystals. If we catch some of the snow on a piece of black cloth we can easily see the different shapes of the crystals.

This moist snow that falls in large flakes

FIG. 76. *Sheep grazing. In the picture the flocks are seeking shelter from the sun beneath the trees.*

comes down so evenly that everything is covered with a layer of snow. (See Fig. 71.) Even the telephone and telegraph wires may have a covering as thick as two fingers. Such snow makes fine coasting and fine sleighing. If it rains a little and then freezes at the end of the snowstorm, the snow becomes covered with a crust, which makes the best coasting.

Snowshoes, such as are used in the deep snows of the coldest parts of the United States, go more easily on soft snow.

The unpleasant snowstorms are those which come when it is very cold and windy. Then the snow particles are very small, like specks of dust. They make the air so thick that one cannot see far, and they cut the face like needle points.

Such snow usually blows about easily, and gets blown away from the windy or *windward* side of an object, and piled upon the other or *leeward* side, making great snow-drifts which may be many feet deep. Some roads may be filled full from fence to fence with snow, while other roads along which the wind can blow are swept bare. Then the sleighing is very bad because one cannot go far without striking bare ground.

Such storms of fine snow often cover railroad tracks so that the strongest engine cannot get through. In some parts of the United States trains are often snowed in for days, until another train comes up with a strong snow-plow that makes a hole in the drifts and clears the tracks.

FIG. 77. *Logs ready to be sawed into lumber. They are brought to the mill by teams or floated down a river.*

Summary. We have learned that the land, the water, and the air are all important, for in one way or another they make it possible for animals, plants, and men to live.

If the weather changes, we must often alter our plans for a day or two, or put on other clothes, or change the amount of heat needed to keep us warm in our houses. People thus, as a rule, think more about the atmosphere than they do about the land or the water, because the weather changes so frequently and often so suddenly.

We know that we ourselves need food, clothing, and shelter from the weather in order to live. We are now going to see some of the ways in which other people help us to secure some of the necessary things which we cannot readily get for ourselves.

Suggestions for Review

(1) Why is it often dangerous to sit on the ground in the spring or fall? (2) What kind of days do you like in winter, and why? (3) Why do farmers like to have their barnyards on the south side of the barn? (4) Which side of a board or stone fence would be warmer in the winter? (5) Why do evergreen trees often get bent over with snow in the winter while other trees do not? (6) Why are street railroads not always able to run cars in the winter? (7) On what kinds of days do you feed birds? (8) Describe some hailstorm you have seen. (9) From whom did the white men learn to use snowshoes? (10) Draw the shapes of some snowflakes. (11) Describe what happens to the snow when you make it into a snowball. (12) On what kind of a day can you best make snow men? (13) Find out about snow sheds built by some railroads. (14) Why is the snow always cleaned up and carted away in some cities? (15) Find out how snow protects the plants.

XIII. OUR NEIGHBORS AND OURSELVES

What Our Neighbors Do for Us. We have already seen that most people live in groups of houses in villages, towns, or cities, and that each house usually contains a family. We speak of the people in the houses near us, whether we know them or not, as our *neighbors.*

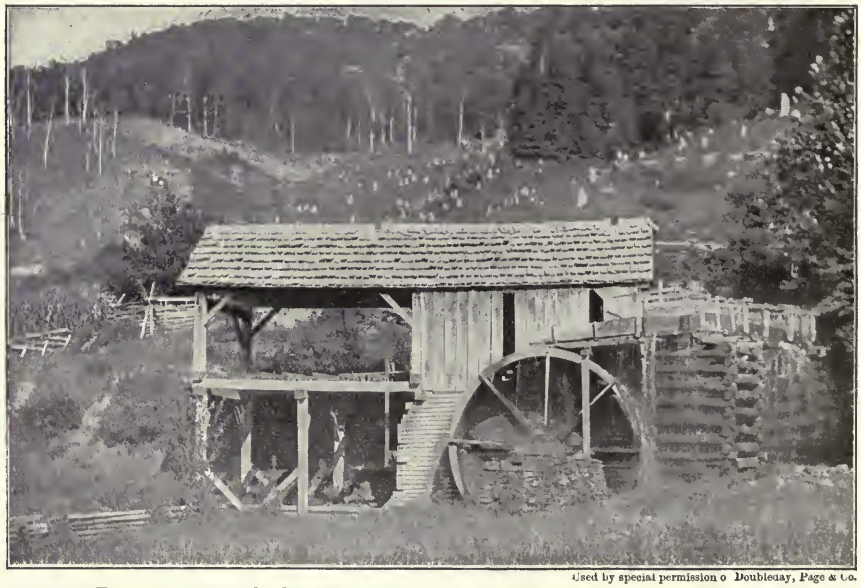


FIG. 78. *An old lumber mill. Almost all mills now use steam instead of water for power.*

FIG. 79. *Unloading stone brought from a quarry, where it is cut into blocks, placed on flat cars, and shipped to its destination.*

Few of us realize, however, how much we depend on people outside our homes, that is, upon our neighbors, for many of the things we need every day. If we stop to think of what we have on the breakfast table, especially those of us who live in large towns or cities, we shall see that we could not live alone, for we could not get our food and clothing by our own work.

A long while ago, when nearly every one lived on small farms, it was possible for a family to procure their food and the wool for their clothing from their own land. The women spun the wool into cloth and smoked the meat so that it would keep, and manufacturing as well as agriculture was carried on upon the farm.

In some parts of the United States people still do all these things for themselves, but as a rule the bread, butter, coffee, milk, sugar, oatmeal or other cereal, and the meat — indeed all the food on our table — is brought from a longer or shorter distance. In large towns or cities people go to the store and buy some things, while others, like milk or bread, are brought regularly to their doors and paid for with money. The bread is made from flour, either at home or in a bakery; the flour was ground from wheat at the mill, and the wheat was raised on a farm somewhere.

The same thing is true of the other articles of food people have daily. Some of them came from a long distance and some of them were raised by our neighbors. If we live on a farm we can raise many things for ourselves, but at least the coffee comes from a long distance, because it will not grow in the United States.

Occupations of Men. If we should go where any one article of food is raised in large quantities, we should find many people devoting their whole time to this one business. In some parts of the country people raise mostly wheat on their farms; in others corn, or cotton, or rice; in other regions cattle or some other important products that can be used for food.

Thus there are many kinds of work, many *occupations*, all of which may be important to us because we use the products every day.

Agriculture; Grazing. The raising of plants from which we get food, materials for clothing, or other useful products, we

FIG. 80. *Transportation by stagecoach. In many hilly and mountainous regions the stagecoach has to be used. Notice the ridges which aid the horses in getting a firm footing.*

call *agriculture*. (See Figs. 72, 73, and 74.) Agriculture is the principal occupation of farmers. Most of the food we eat is raised on large farms, but the little gardens in yards or on vacant city lots are small farms, and are good examples of agriculture.

In some parts of the United States people raise cattle for their flesh, or for their milk, some of which is made into butter and cheese, or for their skins, which are made into leather. They also raise horses for use in hauling loads, and sheep for their flesh, or for the wool on their backs that can be made into cloth and clothing. This occupation is known as *grazing*. (See Figs. 75 and 76.)

One region is better for agriculture and another for grazing, and one farming region may be adapted to raising wheat, while another produces cotton, hay, or potatoes more successfully. We shall see the reasons for this when we study carefully the different parts of the United States.

Lumbering; Quarrying; Mining. The wood for our furniture and houses, and for the manufacture of paper, comes from the forests where *lumbering* or the cutting of trees is the chief occupation. (See Figs. 77 and 78.)

The rocks that are sometimes built into houses or used for paving stones in the streets are taken from the ground. *Quarrying* is the name given to this kind of work. (See Fig. 79.)

Other things besides rocks are secured from the ground, as the *gold*, *silver*, and *copper* which we use for money, the *iron* from which we make our knives, nails useful in building, lamp-posts for the street, and tools for the farm. *Coal*, which we burn to get heat, is also dug from the ground. All these different kinds of work are forms of *mining*, which is an important occupation.

Fig. 81. *Transportation in the Southwest. Miners use pack-horses to carry their outfits over the rough country and through the rivers.*

Manufacturing. Few of the materials taken from the ground, from the rocks, or from the forests in the ways mentioned, are ready for use when they are first secured. Many things have to be done to them while they are being made into things people want.

This changing of so-called raw products into finished goods ready for use is called *manufacturing*, and is well illustrated by the changing of cotton as it is found in the field into cotton cloth as we know it. The cotton is first picked from the plant; it is then cleaned and rolled or packed into large bales; later it is spun into threads, and then the threads are woven into cloth.

From a photograph by Mayo.

Fig. 82. *Primitive transportation in Greece. A horse, cow, and donkey hitched to the same wagon.*

FIG. 83. *A passenger train crossing a river by means of an iron bridge. Railroads are used extensively for land transportation.*

If the cloth is to be colored or printed, it has to go through several more changes before it is finally packed up and sent to the stores to be sold.

Fishing and Hunting. In some parts of the world people get their living by catching fish from the water, or by hunting wild animals for their skins, or for their flesh which can be sold for food. These occupations are known as *fishing* and *hunting*. Before the United States was settled by white people, hunting was very important, for the wild animals were numerous. The Indians, who occupied the country then, secured a large part of their food through hunting. Now hunting is unimportant except in those regions which cannot be used for any other purpose. Fishing, however, is still important because many people eat more fish than other animal food.

Commerce; Money. From agriculture, grazing, lumbering, fishing, and mining we get most of the things every one must have in order to live. If we have to buy the products of these occupations from other people, we have to give them something in return. Their goods have to be brought to us and ours have to be sent to them. This buying, selling, and transportation of goods is known as *commerce*.

In order that the people of a city or country may have all the things they need, goods have to be brought from different places, and many people are engaged in commerce in all parts of the world. Indeed, every one engages in commerce when he buys and sells anything.

Some people devote their whole time to getting goods from one place and selling them in others. To exchange one thing directly for another thing is not always easy. Farmers sometimes carry their hay

Used through the courtesy of "World's Work."

FIG. 84. *Old and modern types of locomotives. The huge modern type in the foreground is called the "Mogul."*

or apples or other crops to a store where they can get sugar, flour, or coffee, or shoes, or cloth in return. Usually, however, it is more convenient for a person having things to sell to get *money* for them.

Money is easily carried about and can be exchanged for anything one needs. Money does not occupy much space, it is easy to handle, it does not spoil, and in every way is more convenient to have as wealth than the same value of food or clothing or any kind of goods.

Summary. We have seen how many people have been helpful to us in securing one of the simplest and most necessary things, cotton cloth. If we should consider all the other things we need every day to keep us alive and comfortable, we should find much the same story. No person can live alone, for every one is dependent on many other people. People in distant regions are working for us and we are working for them.

In order to get money to buy things with, or goods to exchange by means of commerce, it is necessary for every one to have some occupation; that is, some way of earning a living.

Suggestions for Review

(1) Name the crops you have seen growing in a garden or on a farm. (2) Name all the occupations you have seen. (3) Find out some ways which have not been mentioned in which cattle are used. (4) Why are horses used more than cattle for riding or driving? (5) Find out all the animals you can that graze. (6) Mention as many uses of wood as you can. (7) Make a list of all the materials you can that are taken from the ground. (8) What industry that has been mentioned includes the work of the shoemaker, the dressmaker, the clockmaker? (9) What things have you ever bought or sold at a store? (10) Mention the kinds of stores at which your parents trade frequently. (11) If two boys trade jackknives or marbles, what have they done? (12) If you were to play keeping store, what would you need beside the objects to be bought or sold? (13) Why do we sometimes use paper dollars instead of silver dollars? (14) Why is money not made of iron or wood rather than of silver or gold? (15) Why do we not have silver cents instead of copper cents? (16) Find out what the Indians formerly used for money. (17) Where does the grocer get his goods? (18) The butcher? (19) How did the Indians secure their food before white people came? (20) Find out if you can whether they secure it in the same way now?

FIG. 86. *Transportation in a mountainous country. Heavy trains on steep grades often require two locomotives to haul them.*

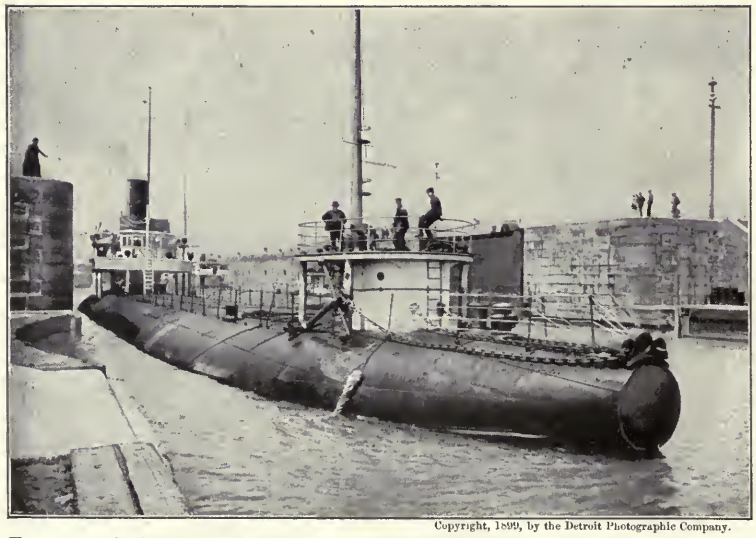


FIG. 85. *Lake transportation. A whaleback freighter passing through the "Soo" locks between Lake Superior and Lake Huron.*

Used by permission of the Chicago Post Office.

FIG. 87. *A railway post office. Mail is distributed in the sacks and boxes and left at the stations along the route.*

XIV. MEANS OF TRANSPORTATION

Transportation. In order to have business and commerce it must be possible to move goods from one place to another quickly. We have seen how the roads and streets in a town or city allow people to move about and carry on business, and we all know how goods are brought to our doors in wagons. Horses and wagons can be used for short distances, but there must be some way of carrying larger loads and moving more rapidly than by horses if business is to be carried on between people who are far apart. *Transportation*, as it is called, is thus a very important part of commerce.

Traveling and transportation may be by land or by water. On the land we walk, ride on horseback, drive in wagons, or ride in cars that are moved by horses, by steam, or by electricity. (See Figs. 81, 82, and 83.) In some parts of the country, as we have already seen, there are no good roads and everything is carried on horseback. There are still more rugged regions, as in some forests and mountains, where few people live, and where explorers must carry all they need in packs on their backs.

Transportation by Rail. Railroad trains are used mostly for traveling or for carrying goods long distances (see Fig. 94), and horses are driven for pleasure or for carrying goods short distances.

Steam or electric roads are generally built so as to connect large towns or regions that have many passengers or much freight to be moved.

As such roads require rails for tracks they cannot be built as readily as carriage roads. Like carriage roads, they have to cross streams by means of bridges (see Fig. 83), and have to be built so as to follow the gentle slopes. Hence many railroads are very winding. It is only over land that is nearly level and plain-like that railroads

Used by permission of Doubleday, Page & Co.

FIG. 88. *Unloading mail sacks from a railway mail car. The bar in the doorway is used to catch mail sacks from posts when the train is in motion.*

FIG. 89. *Distributing mail at a cross-roads station on a rural free delivery route.*

can follow fairly straight courses. As trains go very rapidly and as the engineers running them cannot see very far ahead, a railroad has to be provided with signals to let the engineers know when the track is clear for them to go ahead, and to warn them when to stop.

Transportation by Water. Travel by water is either in steamships, in sailing vessels, or by canal boats which are usually drawn along by horses or mules. Sailing vessels and steamships are used on our larger lakes, on rivers where the water is deep enough, and on the ocean, which is a great body of water that covers more than one-half the world. (See Figs. 90 and 91.) Our large rivers, therefore, are very important routes of commerce.

FIG. 91. *A tugboat used for piloting large ships into or out of a harbor.*

Used by permission of N. L. Stebbins of Boston.

FIG. 90. *A seven-masted schooner. The largest sailing vessel carrying freight in the world.*

Other Aids to Commerce. A great deal of business can be done without the necessity of traveling if people can only get word quickly from one place to another.

There are many ways of communicating quickly with people at a distance, but the *Post Office*, which, as we have already seen, is managed by the national government, is the most common means of carrying messages from one place to another. (See Figs. 87, 88, and 89.)

The *telegraph*, by means of which messages are sent very rapidly along wires by electricity, is also helpful, especially when people are in a great hurry. (See Fig. 92.)

In recent years *telephones*, which enable people to talk with one another though many miles apart, have come to be much used for business and pleasure.

The *typewriter*, a machine for writing letters rapidly and clearly, has made it possible to do business more quickly and accurately. (See Fig. 93.) A business man who makes use of

a typewriter can have many more letters written in one day than he could afford to have written by hand.

Many other things might be mentioned which help people buy and sell more quickly, but those mentioned are the most important, and are the ones that nearly every one can see in use about him.

FIG. 92. *The telegraph and telephone are aids to commerce. Each town has one and each city many large stations from which the wires and cables radiate to offices and homes.*

Suggestions for Review

(1) Why are freight trains generally slower than passenger trains? (2) Why do other vehicles have to keep out of the way of wagons carrying the mail? (3) Why are electric cars taking the place of horse cars? (4) Find out all you can about the way railway trains are kept from collision. (5) Why are double-track roads better than single-track roads? (6) What are express companies, and what do they do? (7) Why are there so many railroads in certain parts of the country and so few in other parts? (8) How are railroads kept in repair? (9) Why do railroads have tunnels in some places? (10) Name the important railroads near your home. (11) What have you ever seen in a freight station? (12) Describe what you have seen in a passenger station. (13) Describe the different ways in which goods are brought to your town or city or the one nearest where you live. (14) What do the postmarks on the front and back of a letter mean? (15) Describe some of the ways by which mail is carried and delivered. (16) Describe all that happened to a letter from some friend before it reached you. (17) How long was it on the way?

XV. DIRECTION, DISTANCE, AND MAPS

Units of Measure. In order to carry on business with people we must know where they live, and how far away they are from us. Some of the Indians of the United States measure how far a certain object is away by telling how many times the sun would set during a horseback trip to the place. We measure the same thing in a different way and say the *distance* from one place to another is so many *feet* or *miles*.

FIG. 93. *The typewriting machine is an aid to the quick and accurate transaction of business.*

A *foot* is twelve inches long; that is, a little longer than this book is high. Most grown people can cover about three feet in each step

In measuring long distances it is more convenient to use the *mile*, which is 5,280 feet in length.

Soldiers carrying a heavy load can march about fifteen miles a day. Some horses can trot a mile in about two minutes,

and most people can walk a mile in fifteen or twenty minutes. Some steam trains run a mile or more in a minute, which is very rapid travel. Freight trains do not often run faster than a mile in three minutes. (See Fig. 94.)

Fig. 94. *The transportation of freight. It sometimes requires two powerful locomotives to move long trains.*

Points of Direction. It is necessary to know not only how far away a place is, but which way to go to reach it. A spider in the center of his web is nearly the same distance from all parts of the edge. If a fly lights on the web, the spider wants to know which way to start to get to the fly; that is, in what *direction* the fly is from him.

We usually find out direction by means of the sun. The sun in all parts of the world rises in the *eastern* part of the sky and sets in the *western* part, which is *opposite* to the east. If we face the sun at sunset our *right* hand is toward the *north* and our *left* is toward the *south*.

In this part of the world the sun rises to the east of us, is to the south of us during the day, and sets in the west. Halfway between sunrise and sunset is *noon*, when a shadow always points north. In the southern regions of the world the sun rises in the eastern part of the sky, is to the north during the day, and sets in the western heavens, and the shadows, of course, point south at noon. North, east, south, and west are called the *cardinal* (or principal) *points of direction*, because all other directions over the surface of the earth are measured in reference to these points.

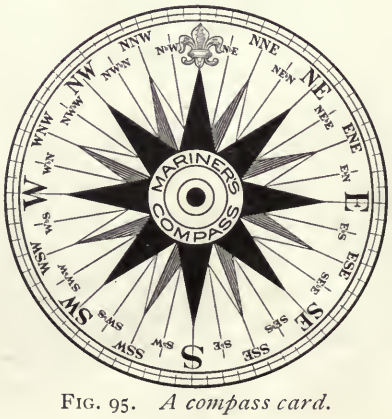


Fig. 95. *A compass card.*

The Compass. It is usually more convenient to find the cardinal points by means of a compass than by the sun. (See Fig. 95.) The *compass* is an instrument that has a special kind of needle supported so that it will swing easily. This needle always points toward the north, and from it the south, east, and west can be easily found. The compass does not, however, point exactly north, and is not as sure a sign of direction as a shadow at noon.

North may be found also at night by means of the North Star. The North Star is a small star in the northern part of the heavens about which many other stars turn in a circle every twenty-four hours. The North Star can be readily found by means of the Great Bear or the Big Dipper. The line joining the two stars marking the outer edge of the dipper always points toward the North Star. These two stars are known as the Pointers. (See Fig. 99.)

Sailors often find the direction they are going by noting the position of the North and other stars. Indians and many other people in different parts of the world use the stars in a similar way.

Between the cardinal points are many other directions, as northeast, which is halfway between north and east; southeast, halfway between south and east; southwest, halfway between south and west; and northwest, halfway between north and west. There are

many other divisions used for careful measurement of direction, but these eight are all that we need to know at present.

Many church spires and tall buildings have wind or weather vanes that always point in the direction from which the wind is blowing. Usually the vane is placed above four branching arms which point north, east, south, and west, and have at their ends a large N., E., S., and W. These letters show the cardinal points and make it easy to tell direction at any time.

From a photograph by Smith.

FIG. 96. *Picture of a schoolroom, of which a map is given below.*

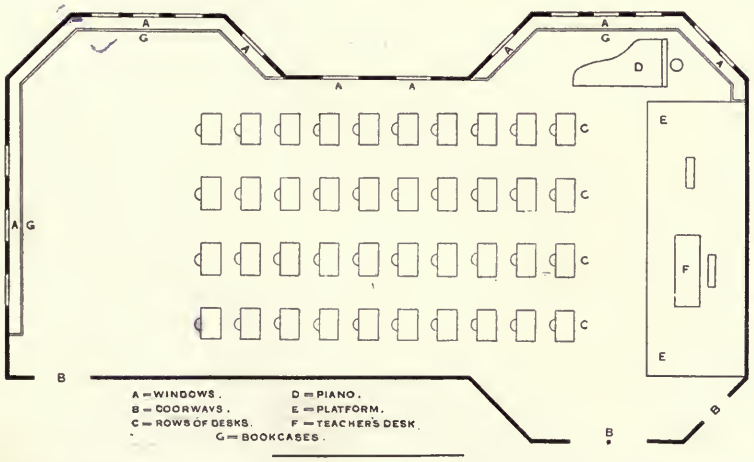
Uses of Maps. If we know the direction and the distance from each other of a number of places, we can make a drawing showing how they would look if we could get above them far enough to see them all at once. Such a drawing or plan is called a *map*. (See Fig. 100.) Maps may show a small region or a large one. We can make a map of our school desk, our schoolroom, of a room at home, of the yard, the farm, the town, the state, or some larger area. (See Figs. 96, 97, and 98.)

Maps enable us to study the direction and distance, or, as we say, the *position* of many different things at the same time, and hence are of much use, especially in learning about distant peoples and places.

Map Scale. In this book the maps cannot be larger than the pages of the book, but they can show an area of almost any size. If it is a large area, we cannot show so many small features of the region as we can if the area is small. (See Fig. 97.)

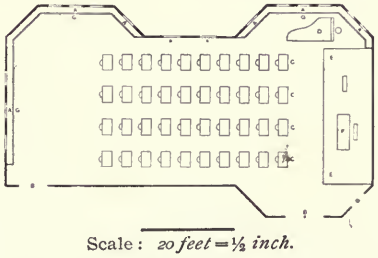
A map covering a large region is said to be on a smaller *scale* than a map of the same size covering a smaller region. (See Fig. 98.) Hence we need to know the scale of the map in order to know whether the area mapped is large or small.

Every map, therefore, should show its scale in some way. Usually a line is drawn on the map, say an inch long, and it is stated that that inch on the



Scale: *20 feet = 1 inch.*

FIG. 97. *A map of the above schoolroom (Fig. 96), with index to objects in the room.*



Scale: *20 feet = ½ inch.*

FIG. 98. *The same map on a smaller scale.*

map stands for one foot, or yard, or mile, or for several miles on the earth.

Wall Maps. Besides such maps as those in this book, nearly every school has large maps to be hung on the wall, called *wall maps*. Such wall maps are necessary in order to show any area in such a way that many can study it at the same time. (See Fig. 100.)

Fig. 99. *The North Star and the Great Dipper with the two pointers on the right.*

Maps are drawn so that the south part is next to you where you can most readily read the names on the map. The north is toward the opposite side, east is toward the right side, and west toward the left side. As we shall see later, however, some maps are drawn so that their sides do not run exactly north and south.

When a map is hung on a wall the top is the north and the bottom the south. This does not mean, however, that things represented at the north of the map are higher than those shown at the south. It merely means that we have hung the map in a certain way so as to read it easily.

The map is a *plan*, and in order to show things exactly as they are on the earth it must be placed in the same position as things on the earth; that is, flat on a table or on the earth, and with *the north of the map toward the north cardinal point.*

Fig. 100. *An outline map of the United States.*

Suggestions for Review

(1) How long does it take you to walk a mile? (2) Find out how far it is between your home and your school. (3) If you live in a city, how many blocks are there to a mile? (4) How many miles long is your town or city? (5) Find out some ways to tell the direction from which the wind is blowing. (6) In what directions can you go along your street or road? (7) Draw a map of the route from your home to your school. (8) Draw two maps of your room at home, using different scales. (9) Secure a map of your home region and find out from it the direction of your house from those of several friends. (10) Learn to tell time by the sun without any clock. (11) Find out how people can tell direction when they have no compass, and when the sun is not shining.

PART II

WORLD RELATIONS AND THE CONTINENTS

XVI. THE WORLD

What the World Is. We sometimes describe a distant country in which we are interested by saying it is in a certain part of the *world*. Before we can know much about the different countries, their products, their peoples, and their occupations, we must know about the *world as a whole*, of which the land about our homes forms but a very small part.

The world is really a great ball or globe, made up of rock, water, and air, and called the *Earth*. This globe is so large that there is room on it for many millions of people, and one could not visit every part of the world even if he traveled all his life.

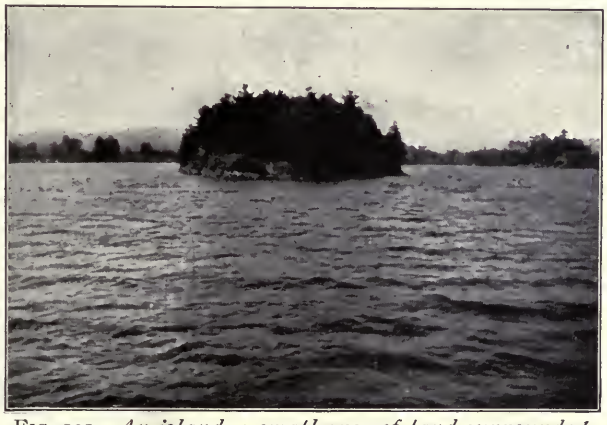


FIG. 101. *An island, a small area of land surrounded by water.*

The North and South Poles. If we take a large orange and hold it up so that the stem end is at the top, we may think of it as a small globe that will tell us something about the much larger globe on which we live. Let us think of north as toward the stem end and south toward the blossom end. Then no matter where we start from, if we carry our finger north it will reach the stem end, the most northern point. This most northern point on the world is called the *North Pole*.

In the same way if we go south from any spot we shall reach the most southern spot, or *South Pole*. The south pole is exactly halfway around the world from the north pole. By remembering what we learned about east and west on a map we can see which way east and west are on the orange.

Around the Globe. Let us take some spot on the orange to represent our home on the earth. We can move our finger around the orange in any direction and come back to where we started. The nearer our starting point is to the north or south pole of the orange, the shorter the distance around in an east and west direction.

Oranges are so small that it is better to have larger balls or *globes* to represent the earth. Globes, like maps, can be made of different sizes and can show a great deal about the world, or only a few things, according to their scale. A large globe, therefore, can show more things than a small globe.

Continents and Oceans. From a good-sized globe we can see how the land and water are arranged over the world. The great land regions are called *continents* and the small areas of land surrounded by water are called *islands*. (See Fig. 101.) Water covers more than one-half of the world. We usually think of this great mass of water as divided into several *oceans*, which, like the continents, have been named.

The United States is one of the countries of the continent of *North America*. West of North America we find the *Pacific Ocean*, and east of it the *Atlantic Ocean*.

If we cross either of these oceans we come to the continent of *Eurasia*, which is often spoken of as two continents, called *Europe* and

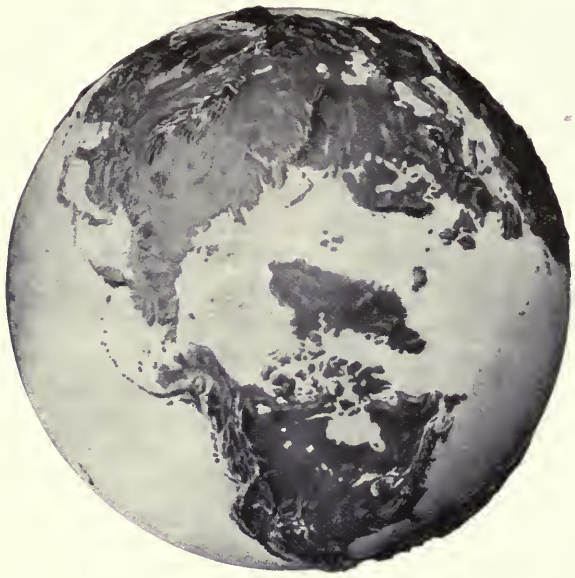


FIG. 102. *The Northern Hemisphere. Notice the large amount of land in this part of the world.*

Asia. If we cross the Pacific we reach Asia; if we cross the Atlantic we reach Europe.

The other continents are *South America*, which lies southeast of North America; *Africa*, which lies south of Europe, and *Australia*, which is nearly south of Asia. In the Pacific Ocean are many islands, some of which are very far from any continent.

If we lived on one of the southern continents we should have to cross an ocean to get to another southern continent, just as we do in traveling between North America and Europe or Asia. Between South America and Africa we find the Atlantic Ocean, as we found it between North America and Europe. In the same way the Pacific Ocean lies west of South America and east of the continent of Australia.

Between Australia and Africa is another ocean known as the *Indian Ocean*. These oceans are the most important ones in the world because they lie east and west of great continents, and border the inhabited regions of the world.

The Northern and Southern Oceans. South of the Atlantic, Pacific, and Indian oceans, and surrounding the south pole, is the *Antarctic* or *Southern Ocean*, which is little known because it lies in such a cold part of the world.

North of the Atlantic Ocean and connected with it by many narrow stretches of water is the *Arctic Ocean*. The Arctic Ocean is connected with the Pacific by the narrow *Bering Strait*, and is thus really a sea almost surrounded by land. The Arctic Ocean was named before people knew much about it or about the differences between an ocean and a sea, and it has retained the name first given to it.

The Hemispheres; The Equator. If we study the size and location of the continents on the globe, we see that the larger part of the land of the earth is in the northern half of the world, or in the Northern Hemisphere, and the greater amount of water in the Southern Hemisphere. (See Figs. 102 and 103.)

All points which are exactly halfway between the poles are said to be on the *Equator*, which means *a line of equal division*. The equator, therefore, divides the earth into half spheres, or *hemispheres*. The world is also sometimes divided into the

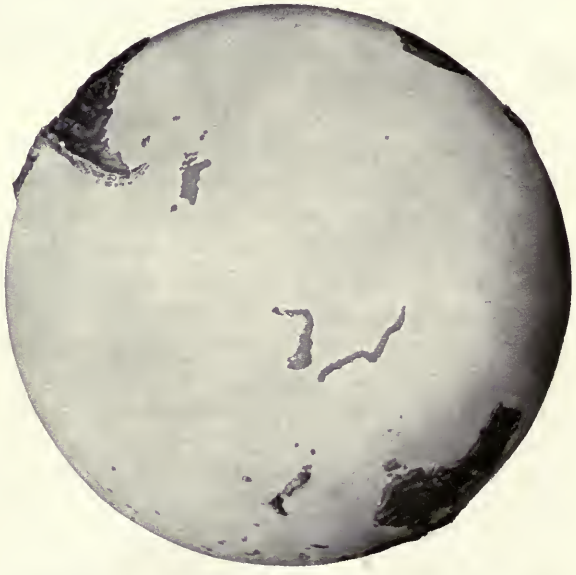


FIG. 103. *The Southern Hemisphere. This half of the world is almost entirely water.*

Eastern Hemisphere, containing Eurasia, Africa, and Australia, and the Western Hemisphere, containing the Americas. (See Figs. 104 and 105.)

Ocean Voyages. From this brief study of the globe we see that in order to carry on commerce or to travel between different continents we must cross an ocean. A voyage by steamer across the Atlantic from North America to Europe takes eight or nine days, except for the fastest boats, which make the trip in a little over five days.

Since the Pacific is twice as large as the Atlantic, a voyage across the Pacific from North America to Asia takes more than two weeks, and a voyage around the world in an east and west direction, without stopping very long in any of the different countries on the way, takes over two months.

Suggestions for Review

(1) From a point in the Northern Hemisphere trace on a globe with your finger several voyages in different directions around the world. Which route is the shortest? The longest? (2) In what direction from the United States is Australia? Africa? (3) In what direction from Western Eurasia is South America? (4) In what direction from Eastern Eurasia is South America? North America? (5) Cut up several apples or oranges into halves and find out if the earth could be divided into other hemispheres than those given in this book. (6) Find out how long it takes to go from the United States to Australia and to Asia by steamer. (7) Find out the quickest time made by a steamer in crossing the Atlantic. (8) Compare this with the time it took Columbus to cross on his first voyage of discovery. (9) Find out what sailors mean by "crossing the line." (10) Why do many steamships carry sails?

FIG. 104. *The Eastern Hemisphere. It contains Eurasia, Africa, and Australia.*

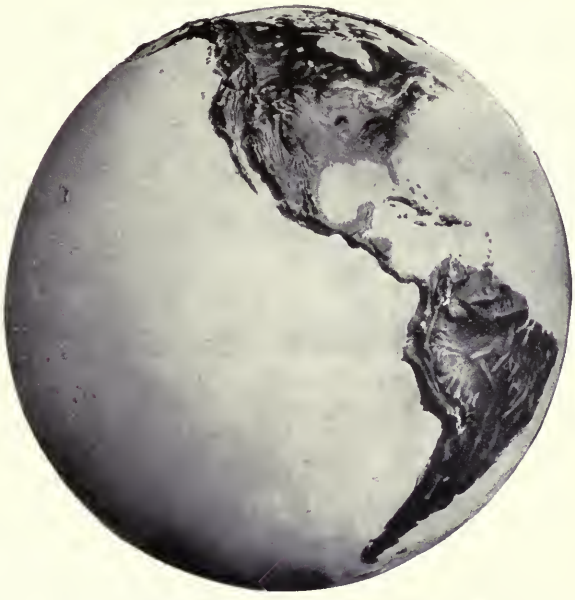


FIG. 105. *The Western Hemisphere. Our homes are in this hemisphere, which contains North and South America.*

XVII. THE OCEAN AND OCEANIC COMMERCE

The Shore Line. The part of the ocean that is of the most interest to us is the *coast;* that is, the line where the ocean joins the land. The coast line, or as we sometimes say, the *shore line*, may be very straight or very crooked. If it is straight, it is exposed everywhere to the violence of the waves, and hence vessels cannot easily make a landing. If it is irregular, there are places where

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FIG. 106. *A view of Marblehead Harbor, showing in the distance the narrow neck of land which connects the peninsula on the left with the mainland. Notice that most of the small boats have anchored in shallow water in the inner bay.*

the water extends into the land, forming *bays*. (See Figs. 106 and 107.)

Shore Changes. The shore line of an ocean or of a lake is constantly changing, because the waves are always beating upon it and wearing it away. The wind blowing over a body of water of any size sets it in motion. The waves rise and fall and finally reach the shore. There they strike a blow that is sometimes hard enough to make the ground tremble and shake. The pebbles rattled along by the waves are hurled against the cliffs, which are gradually worn away.

The loosened rocks are carried along by the waves and left in some bay, forming a *beach* (see Fig. 107), or they may be carried out into deep water and dropped on the bottom. The points projecting between the bays are made of strong rocks, as is shown by the fact that the waves have not worn them away as yet. On shores where the rocks are all of nearly the same strength the beaches may be many miles long without a break; or there may be cliffs. In either case the few harbors make the shore unsafe for sailors during a storm.

FIG. 107. *A small bay separated by a cape from the larger bay beyond.*

Harbors. A bay usually forms a good harbor because it offers protection from wind and waves so that vessels can anchor in safety. (See Figs. 106, 107, and 108.) The waves cannot rise as high in a bay as on the larger ocean, and sailors when near the shore usually try to get into a harbor in time of storm. (See Fig. 106.)

A good harbor is therefore an excellent place, as a rule, for the location of a city. (See Fig. 106.) The *largest city in the United States is New York*, on New York Bay, which is a magnificent harbor. (See Fig. 159.)

Points and Necks of Land. On some coasts the bays are numerous and each bay may have many smaller bays on its edge. Then the coast is very irregular. Between one bay and the next there is, of course, a tongue of land extending out into the water and ending in a point of land. Such a point is called a *cape*. (See Figs. 107 and 113.) If the cape is high and ends in a cliff, it is often called a *headland* or *promontory*. (See Fig. 108.)

The tongue of land may be joined to the mainland by only a low, narrow *neck*. A slight

increase in the height of the water would separate the tongue from the mainland and make it an island. An area of land which is thus nearly surrounded by water is called a *peninsula*, which means *almost an island.* (See Fig. 113.) Sometimes the word peninsula is applied to any large projection of land into the water, as when we speak of the southern peninsulas of Europe or of Asia.

The narrow neck of land connecting one large body of land with another is an *isthmus.* The best known are the Isthmus of Suez, connecting Africa and Asia, and the Isthmus of Panama, connecting North and South America. (See Figs. 131 and 346.)

FIG. 108. *A small peninsula extending out from a headland or promontory. It acts as a breakwater for heavy seas, protecting the harbor within.*

Other Bodies of Water. A very large body of water nearly enclosed by land is called a *sea* or a *gulf*, as the Caribbean Sea or the Gulf of Mexico. (See Figs. 130 and 132.)

A narrow neck of water connecting two large bodies is called a *strait*, as Bering Strait or the Strait of Gibraltar. (See Figs. 130 and 255.) If a bay is shallow and runs more or less parallel with the coast, it is sometimes called a *sound*, as Long Island Sound. (See Fig. 143.)

All these names for forms of water and land we find convenient in talking about the different parts of the world, just as it is convenient to have names for our friends.

Ocean Travel and Commerce. We have already seen the many different ways people travel and carry on commerce over the land. Travel over the ocean is all by vessels or

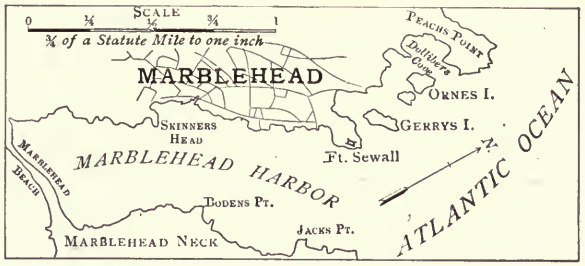

FIG. 109. *A map of Marblehead and the harbor. It shows the form of the shore, the well-protected harbor, and the natural location of the town.*

ships of some kind. Formerly all water traveling was by sailing ships, which were pushed through the water by the wind. Now these are used only where there is no need for haste, as in carrying certain kinds of freight, in fishing, and in pleasure-sailing.

The mails, the passengers, and much of the freight that must go rapidly from one country to another is carried on fast steamships. Some steamships are over six hundred feet in length and large enough to carry train loads of freight and as many passengers as there are people in a small city. Vessels may cross the ocean from one country to another, or they may go along the coast, between different places in the same country. Thus we have *oceanic* and *coastwise* commerce. (See Fig. 114.)

Lighthouses. In order to have water commerce successful, a vessel must be able to get quickly and safely from the deep water of the ocean to the land where goods and passengers can be unloaded. A vessel is

in very little danger, even during a storm, on the deep sea, because it can be driven along for miles without danger of striking the land. When, however, a vessel approaches land it is necessary for the officers sailing the vessel to know its position.

So at certain points along the coasts of most lands there are tall buildings known as *lighthouses*, each of which has a powerful light that can be seen for many miles, and which warns the sailor that land is near. (See Figs. 110 and 111.)

FIG. 111. *A lighthouse near a dangerous coast. It is built on a hidden rock at the entrance to a harbor.*

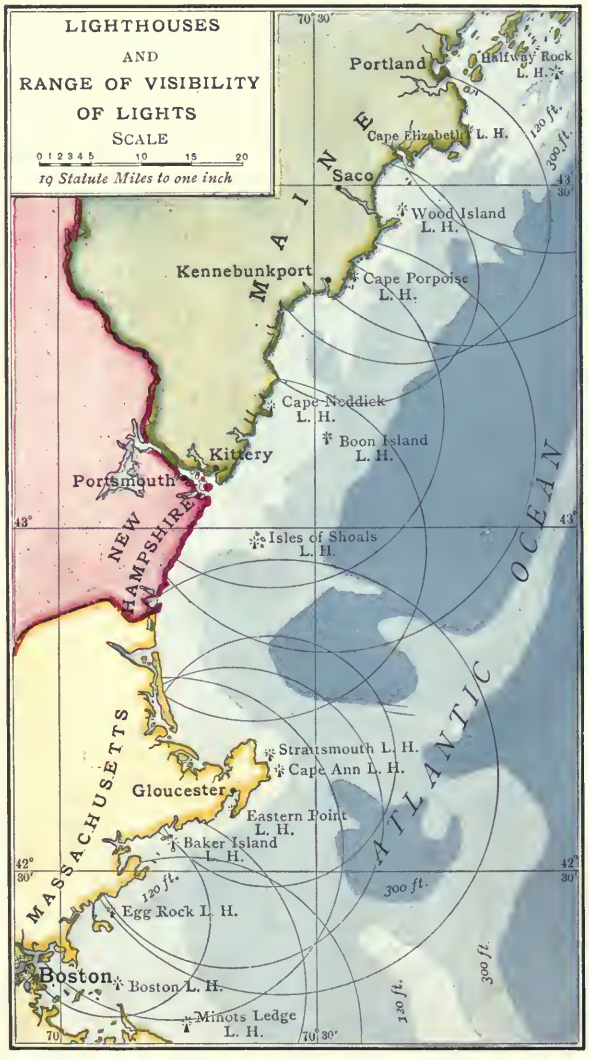

FIG. 110. *The parts of circles indicate how far the different lights can be seen by sailors.*

In dangerous places near the shore or in harbors where lighthouses cannot be built but where a light is needed, *lightships* are anchored.

Life-Saving Stations and Pilots. Along especially dangerous coasts *life-saving stations* are placed, usually about four miles apart. (See Fig. 112.) Men are always on watch at these stations for vessels in distress or danger, and in case of shipwreck the men go out in *lifeboats* to save people. All these many helps to commerce are provided and paid for by the national government.

In every port there are a number of men called *pilots*, who know all about the channels to be followed, and whose business it is to guide vessels in and out of the harbor.

Every harbor also has many powerful little steamers called *tugboats* for helping large ships or sailing vessels. (See Fig. 91.)

How Wharves Aid Commerce. The landing place in a harbor where the vessels load and unload is known as a pier or wharf. Wharves are platforms built out into the water so that deep vessels can come up to them easily. (See Fig. 115.) A wharf also allows more than one vessel to be loading or unloading at the same time, and hence the number of vessels that can use a harbor at one time is greatly increased by building wharves. (See Figs. 115 and 116.)

Telegraphing Across the Ocean. We have already learned how the mails, the telephone, and the telegraph help business and commerce on the land. The mails are also carried across the oceans, between different countries.

The telegraph is also used across the oceans. The wires are strung together as cables which lie on the bottom of the ocean. (See Fig. 117.) Cables have been laid across the Atlantic Ocean for many years between Europe and North and South America, but the first cables across the Pacific between North America and Australia and Asia were not finished until 1903.

Messages are now being sent long distances by telegraph through the air without any wires. Indeed messages have been sent in this way across the Atlantic Ocean, and in the course of time it is probable that wireless telegraphy will become a very important means of communication. This method of telegraphing was perfected by an Italian scientist, Signor Marconi.

FIG. 113. *A picture showing a cape, a peninsula, and an isthmus. This is a characteristic bit of New England shore.*

Suggestions for Review

(1) If you live near a river or lake, find out at what part of the shore the boats are kept. (2) Are they protected, and if so why? (3) In a lake or even in a small puddle find illustrations of cape, headland, neck, peninsula, isthmus. Describe and draw them. (4) Find out the name of the largest vessel in the world and how large it is. (5) Find out how many passengers can be carried on some large steamship. (6) Find some coastwise routes of commerce in the United States; some oceanic routes from the United States. (7) Find out how sailors are warned of danger on a foggy night. (8) Describe some different kinds of lighthouses. (9) Find out why it is almost impossible for a lifeboat to sink. (10) Find out who built the first ocean cable. (11) Find out about the work of the life-saving men.

FIG. 112. *One of the life-saving stations which are kept by the United States Government along dangerous coasts.*

XVIII. THE PRODUCTS OF THE WORLD BROUGHT US THROUGH COMMERCE

Where We Get Coffee and Cocoa. We have already seen that many of the things we need every day are secured through trading with our neighbors. All over the world, neighbors are buying and selling, and the people of

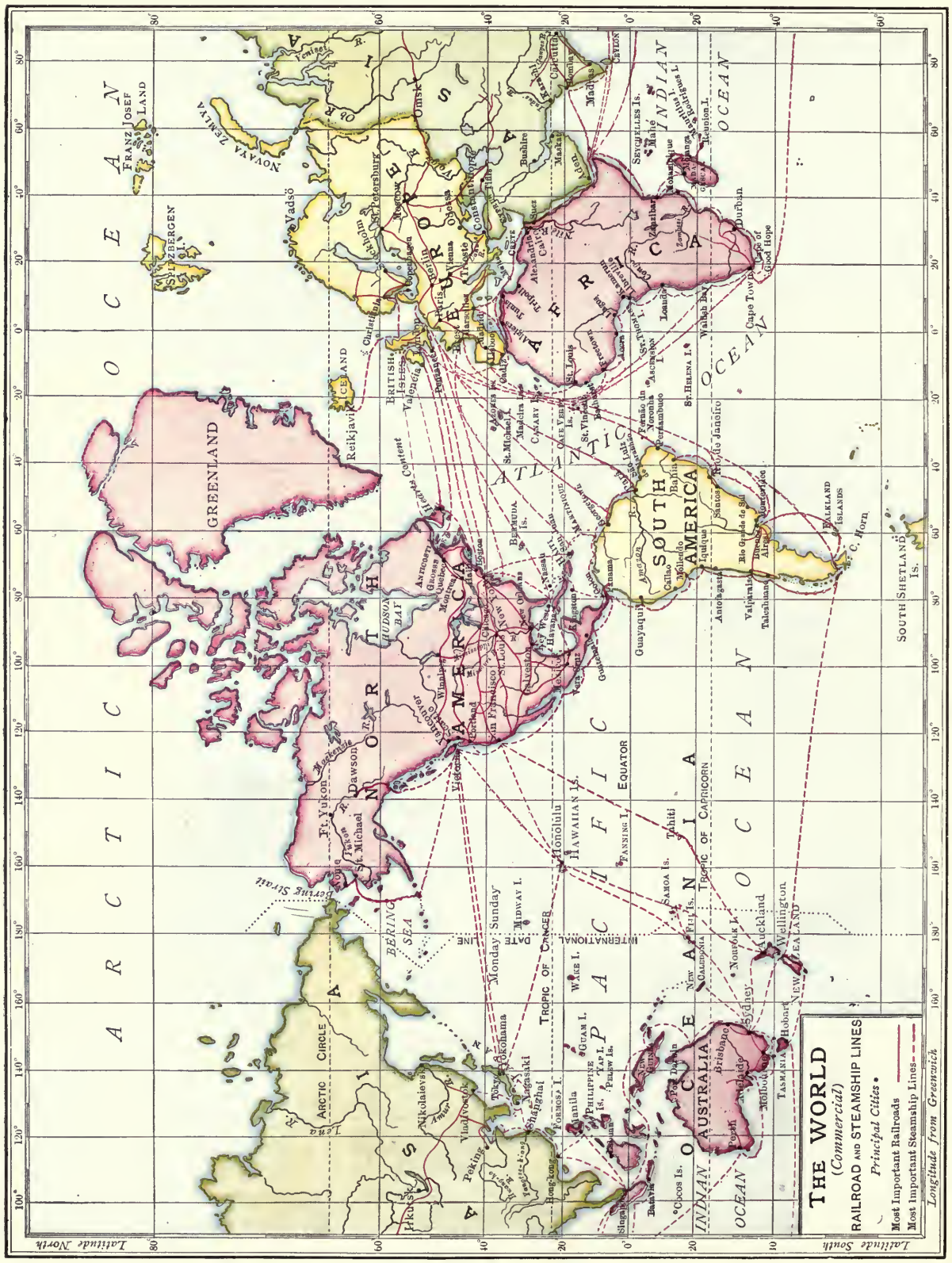

FIG. 114.

distant parts of the world are carrying on commerce with us.

We found this out from the fact that the coffee which nearly every family uses daily is not raised in our own country. The larger part of our coffee comes from the great countries to the south of the United States. Some of it comes from *Mexico* and *Central America*. These countries send us also much of our cocoa, which is made from the seeds of the cacao tree, and great quantities of bananas, which come by water to our seaports.

FIG. 115. *Wharves built out from the shore so that large vessels can easily land.*

How People Live in Mexico and Central America. In Mexico and Central America people live very differently from the way they live in our own country. Their houses are often little more than sheds, with the roof covered with straw instead of boards. (See Fig. 120.) The people practically live out of doors, with just enough shelter to keep off the rain and the sun. The dress they wear is very much like our summer clothes, and is light and loose so as to keep them as cool as possible. It is evident, therefore, from the way the people live that it is always warm in these countries, and that there is no winter such as we know.

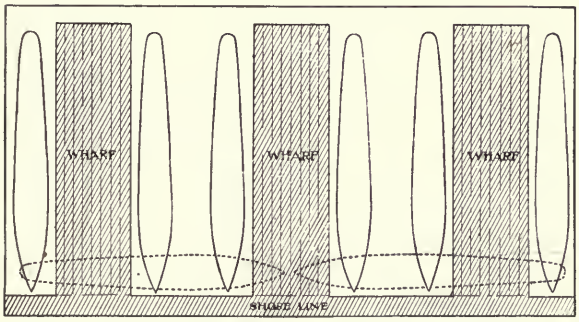

FIG. 116. *Diagram showing the increase of shore line by the building of wharves. Where two vessels were formerly docked, space for six is now provided.* (*See Fig. 115.*)

Plant and Animal Life in Warm Regions. In a large part of Central America there are other things that would remind us of our summers. Most of the trees are always green and the forests seem full of animals and small plants. The animals and plants, however, are not like those we know in the woods in our own country.

In these warm regions everything grows readily and it takes but little work to get a good crop from the soil. Hence the people do not have to hurry and work as hard as the farmers we know. We go to these countries for cocoa, coffee, bananas, and other common articles of food, produced only in warm climates. The continuous warmth of this region enables things to grow there that we cannot raise at home, except at great cost in greenhouses.

The Far North. In the *far northern part* of the continent of North America and in *Greenland* the conditions are very different from those we have just described. There

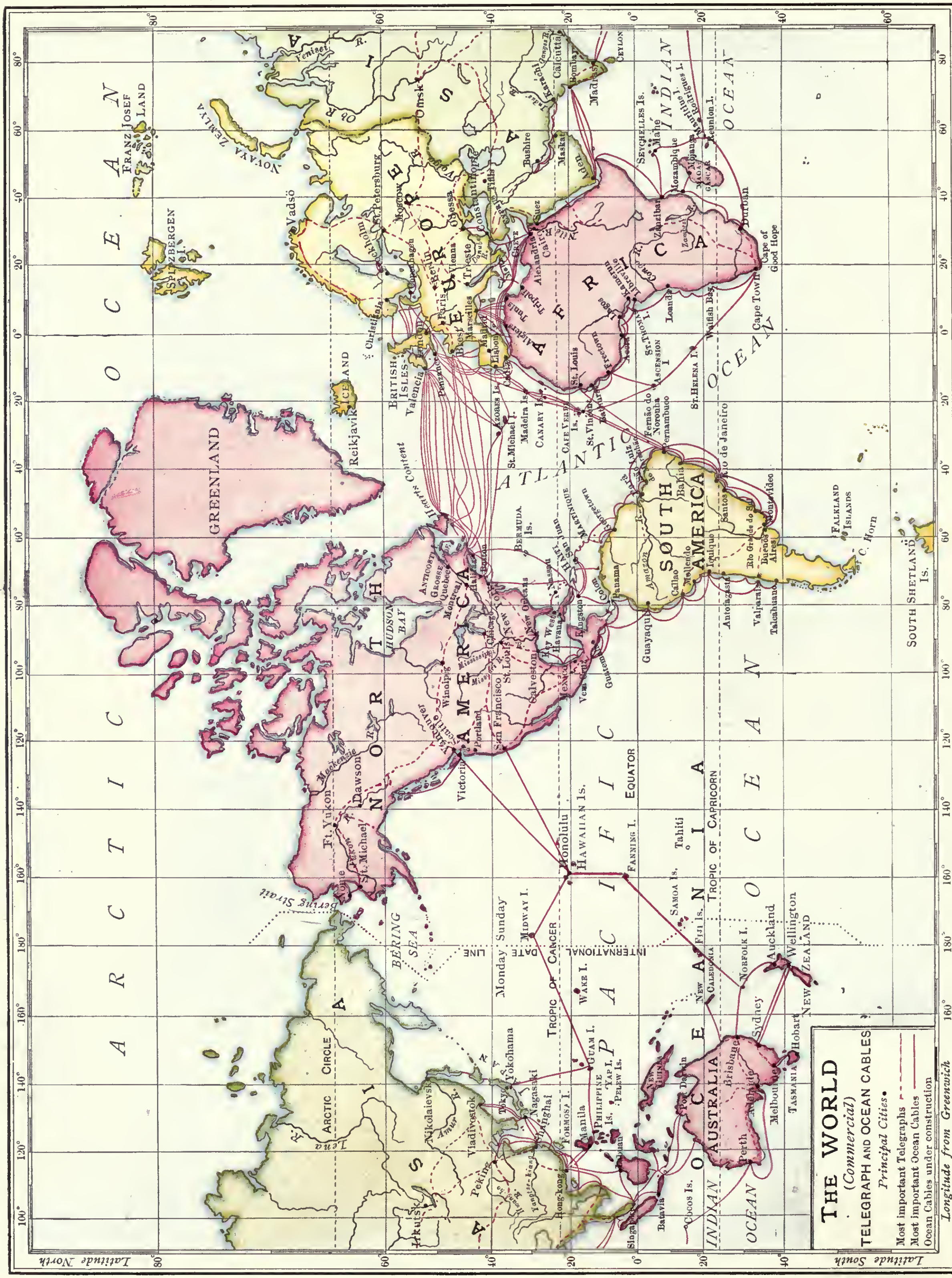

FIG. 117.

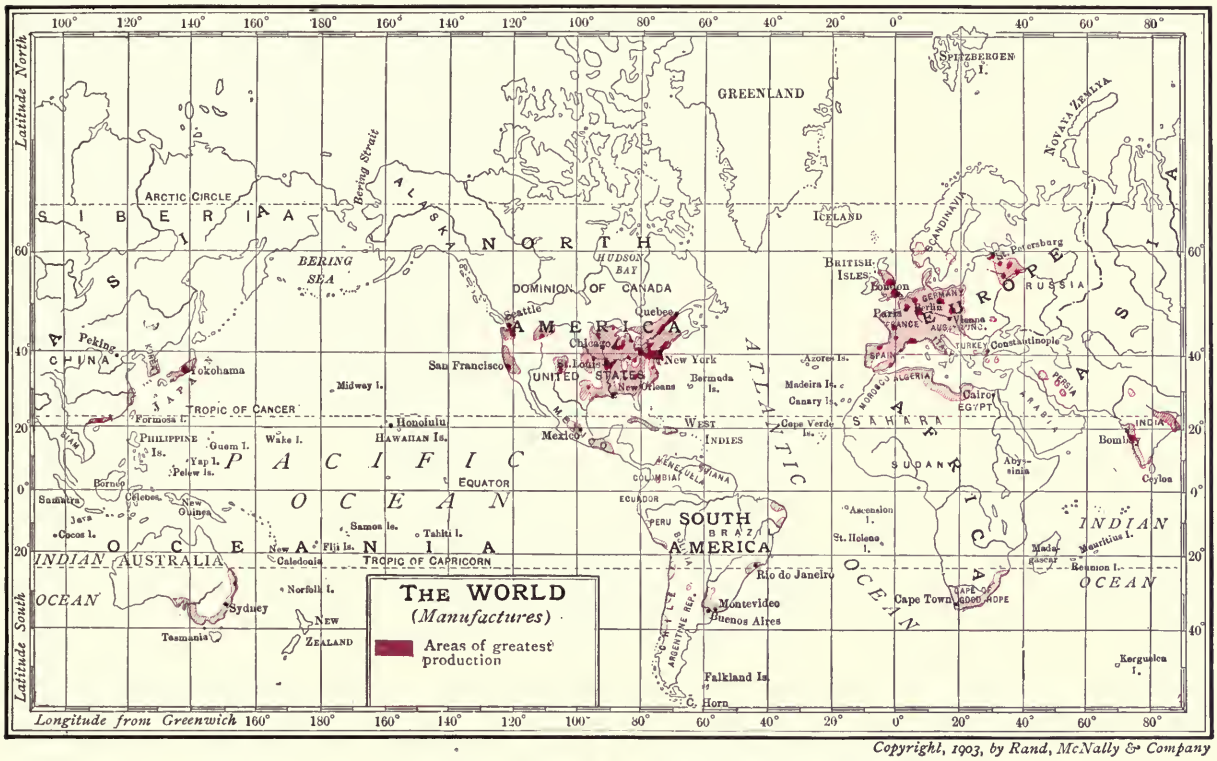

FIG. 118. *A Map of the World, Showing Distribution of Manufactures.*

are no forests, and in some regions not even bushes. In the summer, berry bushes and a few other plants may bloom, but no crops can be raised.

The people, who are either *Indians* or *Eskimos*, live by trapping the beaver, mink, otter, bears, or by hunting seals, whales, walruses, and other animals that have fat or valuable furs. They use the *fat* of the seals, whales, and walruses for *light* and *fuel*, and the skins of the fur-bearing animals for clothing at all seasons of the year. (See Fig. 119.)

The *furs* which they do not need are sent to other parts of the world. So from these northern countries we get many of the furs for our coats, muffs, robes, and other things which we use in winter to keep us warm.

How People Live in the Cold Regions. As these northern Indians and Eskimos wear fur clothing all the time, they must have much weather similar to the winter season in the coldest parts of the United States. In summer their days are fairly but not uncomfortably warm; their long winters are extremely cold.

The kind of weather in these cold regions is shown also by the kind of houses the people live in and their ways of traveling. The winter houses are built of snow and ice, but they are very warm, because there is little chance for the wind to get in. The summer houses are tents made of skins. The people travel largely by sleds drawn by teams of dogs over the ice and snow, which cover the country most of the year. (See Fig. 227.)

The food of these people is very different from that of people who live in warm countries. They eat much fat, because fat produces heat in the body.

We thus find that the climate and the products are very different at the two extremities of North America.

South America. The same thing is true in South America, only there the more southern countries are the colder.

The northern countries of South America are the greatest coffee-producing regions of the whole world. They send us also our *rubber*, which is the juice from a tree. We sometimes have small rubber plants as ornaments in our houses, but they never grow more than a few feet high, no matter in how warm and moist a room we keep them.

The people in these countries live out of doors even more than do the people of Central America, and they wear very few clothes. The weather is always as warm as a warm summer day in our country.

From southern South America we get *wool* and *skins* from sheep, and *hides* and other products from cattle. (See Fig. 123.) This is evidently, therefore, a *grazing* country like parts of the United States, and must resemble our own land in climate. The extreme southern part of South America does not carry on commerce with us, because the region has no valuable products. The

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FIG. 119. *Eskimo women and child. Their clothes and boots are made of skins.*

From a photograph by Mayo.

FIG. 120. *A native Mexican hut. The covering is made of twigs and woven leaves.*

Indians there dress in skins and remind us of the Eskimos of North America.

Products Depend on Climate. Nearly all parts of North and South America, therefore, are known to us through their products which we see and perhaps use every day. Both the cold and the very warm regions of these two continents carry on commerce with our milder or more temperate regions, and by studying the products sent to us in commerce we can learn something about the climate of these countries. (See Fig. 125.)

Products of Eurasia. So far as commerce is concerned, Europe is the most important continent to the United States, for we send to Europe by far the larger part of the products we have to sell. As we have already seen, however, Europe is only the western portion of Eurasia, which is the largest mass of land in the world.

In northern Eurasia we find the coldest part of the world, and from this region we get *furs* as we do from northern North America. From southern and western Europe we secure *olives*, *olive oil*, *wine*, *cheese*, and many manufactured goods, like *cutlery*, *linen*, and *cotton embroideries*. The olive and wine-producing grape grow only in the warm or mild regions which have a climate like the southwestern United States. (See Fig. 124.)

In the southeastern part of Eurasia is a great region where *rice*, *spices*, and *tea* are

raised. Most of the tea we drink comes from here, and the warmest section furnishes our *black* and *white pepper*, *nutmegs*, *ginger*, and *common spices*. The people live in houses which will keep them as cool as possible at all seasons, as they do in the hot regions of Central and South America.

Australia. Southeast of Asia, in the Southern Hemisphere, is the smallest continent, Australia, which is famous for its *wool*, *hides*, and *skins*. These products remind us of southern South America, and the people are engaged in the same kind of occupations.

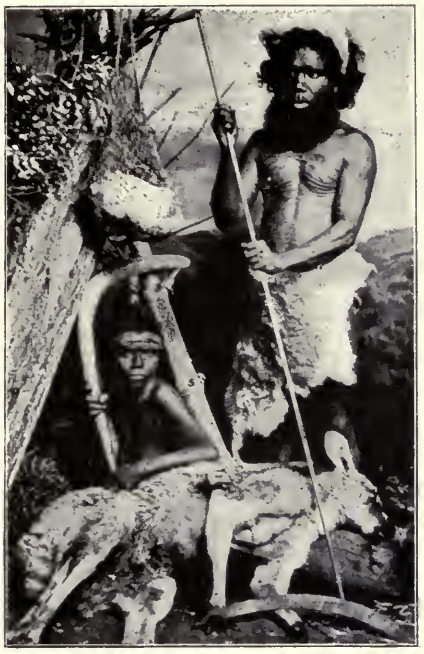

FIG. 121. *Australian natives. The skin of the kangaroo is very useful.*

Africa. The continent of Africa is the least known of all the continents, but it sends goods of great value to other countries. From northern Africa comes a kind of *cotton*, which indicates that the climate must be very like that of the extreme south of our own country.

From central Africa, which is largely inhabited by wild tribes, mostly black people, we get the greater part of our *ivory*, which is used for paper cutters, knife handles, piano keys, and for many kinds of ornaments. Ivory is procured from the tusks of elephants, which live only in very warm countries.

The forests, the houses, and the dress of the people, the animals, many of which have no hair or fur to keep them warm, the insects, and the brilliantly colored birds all show that central Africa is one of the warmest regions of the world.

In southern Africa there is a great region which produces food products like those of our own country. Hence our commerce with this region is very small in amount. The only special product from South Africa is diamonds. Diamonds can hardly be considered necessary for any one, and therefore we cannot think of South Africa as especially important to us.

Commerce Unites the Continents. From this glimpse we see that all parts of the world may be of importance to each one of us nearly every day. At any meal we may eat food that has come from several very remote countries, and many shop windows show us goods that have come from all the continents. Thus not even a great country can live all by itself, for it cannot produce all the many things its people need.

FIG. 122. *A busy harbor, showing ships loaded with produce which go to all the continents of the world.*

As the railway train and the wagon make the farm products near to every city child, so the farmer is really a helpful neighbor, though he does not live next door perhaps. Commerce really makes all the continents neighbors. Thus the whole world is important to us,

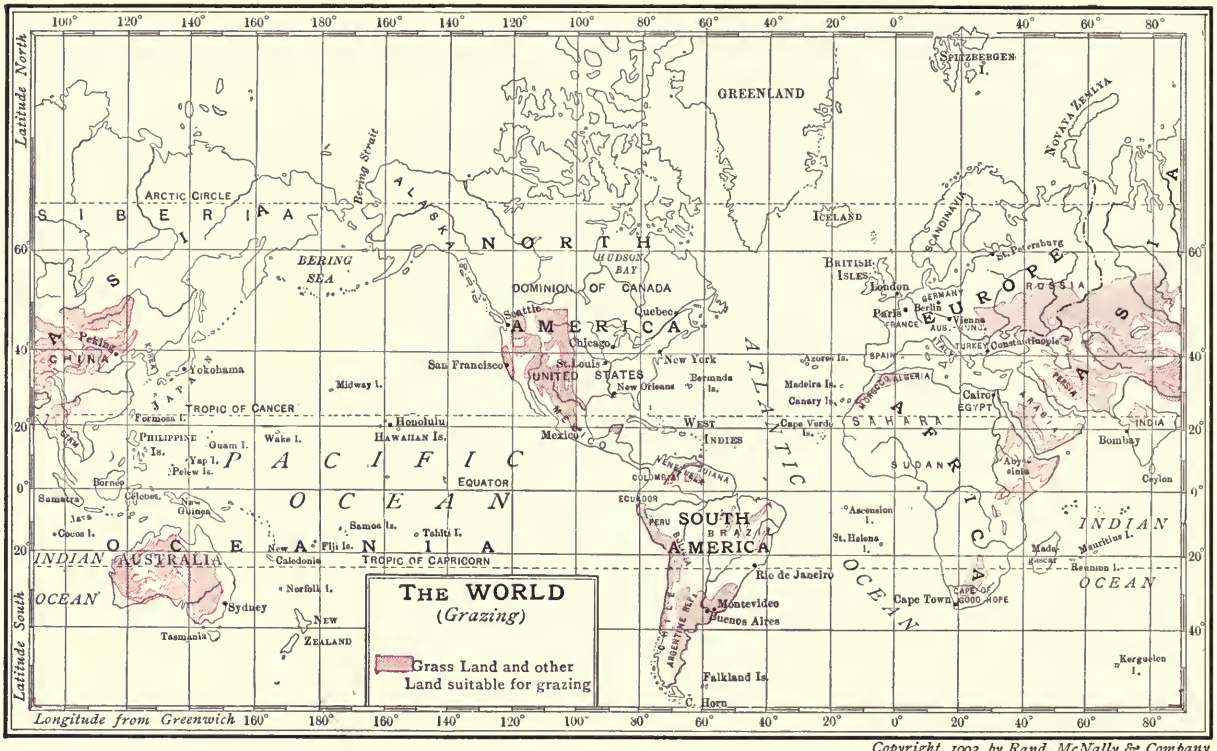

FIG. 123. *A Map of the World, Showing the Areas of Grazing Land.*

and we are citizens not only of our own town, but of the state, the nation, the continent, and the entire world.

Suggestions for Review

(1) Find out as many articles of food as you can that come from warm countries. (2) Which are warmer, light-colored or dark-colored clothes? (3) Which would you expect people to wear in warm countries? (4) Why do we often use light-colored umbrellas or parasols in the summer? (5) Find out about whales and why they were formerly very important. (6) What kinds of skins have you seen used for wraps? (7) Find out what American has done the most exploring in the cold north. (8) What do the people of cold countries eat in the winter? (9) Why is very little known about the great southern ocean? (10) What clothes would you need for a trip from the extreme southern part of our continent to the extreme north? (11) From a globe see what parts of Europe are as far north of the equator as is the United States. (12) What parts of Africa are crossed by the equator and hence are in the hottest regions? (13) In what kind of climate and in what countries do elephants chiefly live? (14) Find out if all elephants have tusks. (15) What do we secure from the tusks of elephants? (16) In what other ways are elephants important?

XIX. THE CLIMATE OF THE WORLD

What Climate Is. From what we have already seen, we can readily understand that the most important reason why one part of the world can best raise one thing and another part something else is because their climates differ, and different kinds of climate are better for different crops.

By *climate* we mean the kind of weather a region has in the course of a long time. We know, for instance, that in our own home region the heat of the summer or the cold of the winter never goes beyond certain bounds. There are, as a rule, a certain

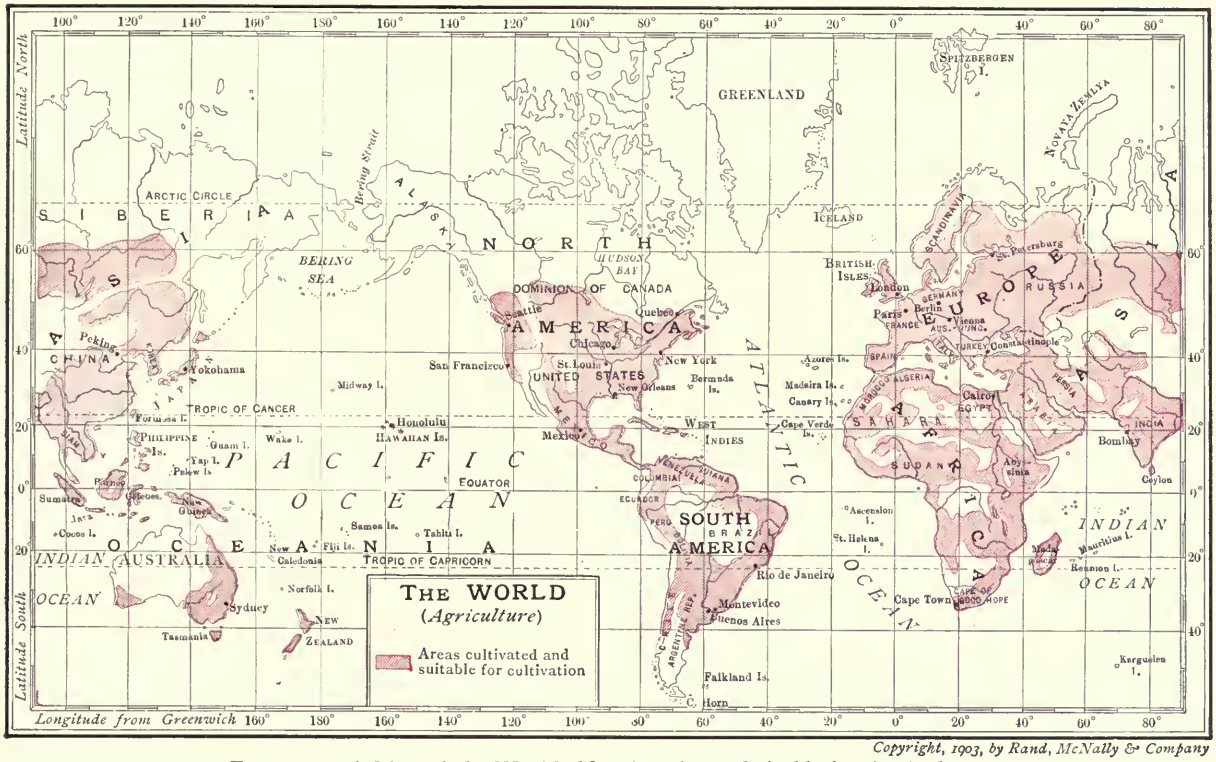

FIG. 124. *A Map of the World, Showing Areas Suitable for Agriculture.*

number of cloudy days, and the rainfall is nearly the same in amount year after year. In the same way the wind blows from the west more than from the east, and there is more good weather than bad weather. By putting all these things together we can describe the climate of our home region.

Temperature. The most important feature of the climate and of the weather, and the one we talk about the most, is the *temperature*, that is, the heat or cold of a region. If it is too cold for comfort we try to warm our houses, and if it is too hot we shut out the sun's heat as much as possible and do everything we can to keep cool.

The Cold Caps. According to the temperature, we divide the world into five belts or regions known as *Heat Belts*. (See Fig. 125.) About the North Pole and extending nearly one-fourth of the way to the equator is the *North Cold Cap*, in which the climate is so cold that no crops can be grown. Within the region of the North Cold Cap are a large part of northeastern North America, including the large island of Greenland, nearly the whole of Iceland, and the very northern coast of Eurasia.

About the South Pole is the *South Cold Cap*, which extends nearly one-half of the way to the equator. The only continent that extends into the South Cold Cap is South America, the very tip end of which is in this cold region.

In the center of the Cold Caps there are enormous areas of snow and ice which never disappear. Such masses of ice are known as *glaciers*. They are formed by the rain or snow which falls there. As the snow lies on the ground it is pressed down by the weight of the snow on top, until finally most of the air in the snow is pressed out. Then blue ice is formed. Parts of these glaciers often break off when they reach the ocean, and the great blocks formed by the breaking float away as *icebergs*. These icebergs are often found in our oceans in the spring, but

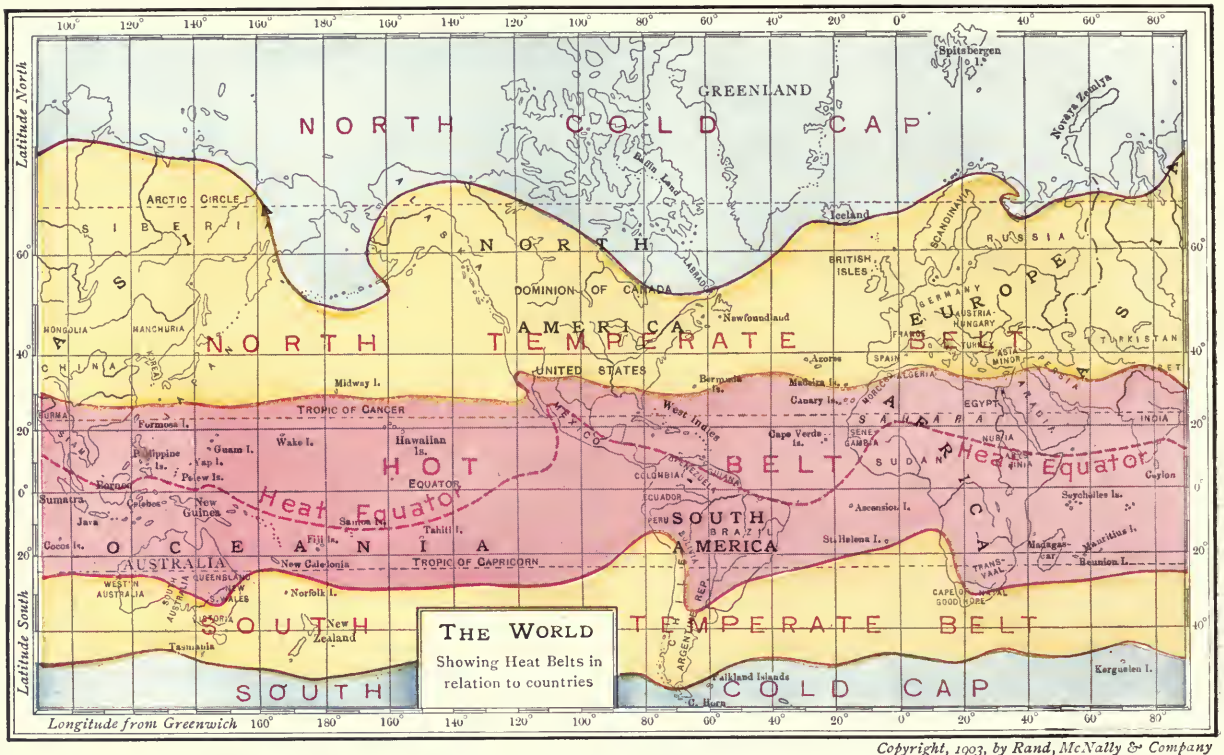

FIG. 125. *A Map of the World, Showing the Location of the Heat Belts. Compare with a Globe.*

they do not last long because they are carried southward and are melted by the warmer waters through which they float.

FIG. 126. *A watering place in the very dry Hot Belt region of Egypt.*

The Hot Belt. About the equator there is a region that is always very hot, where the nights, as a rule, bring no relief from the weakening heat of the day, and in a large part of which the rainfall during the year is very heavy. This region is known as the *Hot Belt*.

The Hot Belt is found on both sides of the equator and extends a little more than one-fourth of the way toward the South Pole and about one-third of the way to the North Pole. In it are found the following regions: Mexico, Central America, the West Indies, the southern part of the United States, nearly two-thirds of South America, all of Africa except the northern and the southern tip, the southern countries of

Asia, the northern two-thirds of Australia, and the islands between Asia and Australia. In certain parts of the Hot Belt, as in Northern Africa and Australia, it is very dry. Trees and water are very rare. (See Fig. 126.)

The Temperate Belts. Between the Hot Belt and the South Cold Cap is the *South Temperate Belt*, in which lie a small part of South America, the southern tip of Africa, and the southern third of Australia. The region between the Hot Belt and North Cold Cap is the *North Temperate Belt*, in which lies the larger part of the United States. The North Temperate Belt contains about two-thirds of North America, nearly all of Europe, and the larger part of Asia.

Nearly one-half of the land of the world is thus in the North Temperate Belt, and in this belt are the largest and most progressive nations of the world. The temperate belts have cold winters and warm summers, and the summers are long enough for crops to ripen. In the winter the trees and plants cease growing, many of the animals get thick coats of fur or go to sleep for several months, and many of the birds fly away to warmer regions.

Causes of Heat Belts. It is very evident from what we have learned about the Heat Belts that the heat which comes to the earth at any season is not evenly distributed over the earth. We cannot explain fully in this book why this is so, but we can give the more important reasons.

The earth is heated by the *Sun*, which is a very large, very bright, and very hot ball of matter at an enormous distance away. It sends its light and heat out in every direction, and only a very small part of this light and heat reaches the earth.

If we take a large electric arc lamp to represent the sun, we can see how the light and heat go out in all directions from a warm and bright globe. Though the earth gets a very small part of the sun's heat, it depends upon the sun almost entirely for its variations in temperature.

Climate and Altitude. As we have seen from this brief glimpse at the Heat Belts, the climate continually grows colder, as a rule, as one passes north or south from the equator toward the Cold Caps. It is possible, however, to get the same changes in climate by going up a mountain in any part of the world. The upper air is always colder than the lower air, and the greatest highlands, even in the Hot Belt, reach into the region of perpetual snow.

People take advantage of this fact when they go to the mountains in the summer to keep cool, or when they drive their cattle from the mountains down into the lower lands in the winter to escape the severe mountain weather. The line of perpetual snow is higher up the mountains in the Hot Belt than it is in the Temperate Belts, because it is hotter in the lowlands and one has to rise higher to reach air that is freezing cold.

FIG. 127. *How we get daylight. The globe represents the earth, the lamp the sun.*

How We Get Daylight. A schoolroom globe held in front of a lighted lamp in a dark room will easily show us how the light and heat from the sun are scattered over a globe like our earth. (See Fig. 127.)

We can see that one-half of the globe is lighted, while the other half is not, and that the portion of the dark side nearest the light side is only partly dark, or, as we say, in *twilight*.

The globe cuts off the light from the region behind it; that is, the globe casts a shadow. This is just as true for the earth, and in the daytime we are in sunlight, in the night we are in the shadow, and just before sunrise and just after sunset we are in *twilight*.

Rotation of the Earth. How can we be first on the side of the earth toward the sun and then later on the other side, with the earth between us and the sun? In just the same way a button on the front of one's coat is on the side toward the fire when one faces the fire, and on the shadow side when one *turns around* to warm his back. The earth turns around every day, and thus the light and heat of the sun are scattered over one part at one time and another part at another time.

FIG. 128. *A mounted globe, showing the position in which the earth rotates.*

The earth turns or *rotates* on the line connecting the north and south poles as a top turns on the line connecting stem and point. (See Fig. 128.) This line through the earth is called the *axis* of the earth.

The Earth's Yearly Journey. Just as a top sometimes circles across the floor, or on a stand, as it spins, so the earth also moves or *revolves* around the sun, and once in a year it comes back to its starting point. A top will sometimes spin while its axis is leaning over so that it looks as if it would fall. This is the position the earth rotates in all the time. (See Figs. 128 and 129.)

As the earth moves around the sun, the sun shines directly upon one part of the earth at one time and upon another part at another time, but it always lights up just one-half the earth, as we have seen. As a result of the motion of the earth about the sun, the sun does not seem to be in the same place in the heavens at the different times of the year.

Cause of Winter and Summer. In the winter our part of the earth does not get the sunlight as many hours a day as it does in the summer. The sun does not rise so high in the heavens and does not shine so directly upon us; therefore we do not get as much heat as we do in the summer when the days are longer and the sun rises higher in the sky. While the northern hemisphere is having winter, the southern hemisphere has summer. Six months later, while we are having summer, the southern hemisphere has its winter.

The Equator. In the northern parts of the world, as we have already seen, the sun is in the south at noon, and in the southern part it is in the north. There must then be some region between the north and south poles where the sun is directly overhead at noon. The middle of the part of the earth in which the sun is always overhead somewhere is known as the *equator*.

We have seen that the warmest part of the year comes when the sun is highest and when the days are long. Then places which have the sun directly overhead most of the time must get much more warmth than those where the sun shines obliquely. Therefore the regions about the equator are the warmest and it is here that we have the Hot Belt.

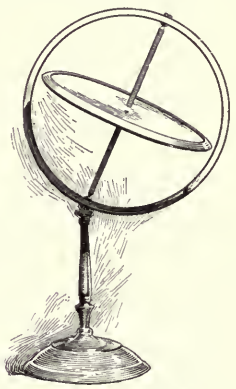

FIG. 129. *A spinning top. The circular top when revolving and placed on the stand may take the position shown, which is the same as the position taken by the earth.*

The Seasons. Twice a year, in March and September, the sun shines on the earth from pole to pole and is directly overhead at the equator. In spring the sun is rising higher at noon each day, and in autumn it is getting lower each day. In the spring the ground warms up, the farmers plant their seed, the birds and insects appear again, and everything is full of life. In the autumn the crops are harvested, many of the birds disappear, the squirrels store up food for winter, the leaves fall, the cattle grow thicker coats, and everything prepares for winter. Spring with us begins in March, but the Southern Hemisphere is having autumn in March, just as they have winter when we have summer and summer when we have winter.

In the Hot Belt the temperature changes so little during the year that the seasons are not called *spring*, *summer*, *autumn*, and *winter*, as they are in the Temperate Belts. There are times in the Hot Belt when the plants grow luxuriantly, and others when they grow slowly. The difference is due to the presence or absence of rain, and hence the seasons are called the *rainy season* and the *dry season*.

Summary. We have now seen how the different countries of the world exchange their products with one another. We have also learned that no one is able to live alone, but that each one of us has things every day to eat or to wear that have come from a long distance, perhaps from another country and another heat belt.

Let us now return to our own continent, which, of course, is the most interesting and important to us. Let us find out about the people and their work, about the products of the country, and where and how they are secured.

Maps. When we study a continent or a country carefully, we need a map large enough to show more things than can be shown on a globe. A map of any part of the world is, of course, really a piece of a globe drawn on a large scale so as to show more things. The globe has a curved surface and a map is flat. If we cut the skin of an orange in several pieces, cutting each time from stem end to bloom end, which represent the north and south poles of the earth, the lines between the pieces would all run north and south. If we should then try to flatten out one of the pieces to make it flat like a map, it would break apart. Therefore it is hard to express the globe surface on a map.

There are, however, many ways of showing a globe surface as a map, and several are used in this book. In studying these maps we should remember that they represent parts of the curved earth. The continuous black lines extending up and down the page, or nearly so, all run north and south like the edges of the orange peel, and the same kind of lines extending across the page run east and west. Thus on maps of so large an area as that of North America, the top of the map is not exactly north and the sides are not exactly east and west. The dark lines will, however, tell us the direction, and thus we can easily study direction on the maps.

Suggestions for Review

(1) Look at a globe and see why we say cold *cap* rather than cold belt. (2) Describe the position of the axis of a globe. (3) Compare the position of the leaning top with that of a globe. (4) Move a tilted globe about a light and describe where twilight is found. (5) At what time of day is your shadow the shortest? (6) Which way does your shadow point at noon? At sunset? In early morning? (7) Find out what we mean by the equinox, which is the name for the time in March and September when the sun is over the equator. (8) Describe as many things as you can that occur in spring. In autumn. (9) Why do most schools have a long vacation in summer? (10) At what time of year do we have thunder showers? (11) Why are the streams often in flood in the spring? (12) How does the landscape in winter compare with that in the summer?

AIDS FOR TEACHERS

The suggestions on Part I. have been arranged primarily to show how nature study and handwork may be related to geography in such a manner as to be a help in the geography work.

SUGGESTIONS TO ACCOMPANY PART I

I., II., and III. Pages 7, 9, and 10.

Homes: Indian — Framework for tents constructed; skin or other material used.
Eskimo — Homes made of clay.
Streets and Roads: Arrangement of roads, houses, etc., shown by the sand table.
Guideposts made.
Buildings constructed of thin wood.
Arrangement of streets in towns shown.

V. and VI. Pages 16 and 19.

Slopes: Children's conception of level country, rolling country, etc., on sand table.
Routes followed by roads shown in each case.

VII., VIII., and IX. Pages 22, 26, and 29.

Stream development and work of water shown:
Formation of stream.
Making of channel.
Carrying of detritus.
Deposition of detritus.
A river system — Hills, plains, and valleys.
Formation of lakes: (*a*) By means of a natural obstruction; (*b*) by means of a dam.
Rapids and waterfalls.
Filling and draining of lakes.
NOTE: Out-of-door work is important at this stage.

X. Page 32.

Gardening: Peas, etc., started in various soils.

XI. and XII. Pages 36 and 40.

Non-instrumental weather observations:
Winds — Direction.
Weathervane constructed.
Velocity — Classified as calm, light, strong, etc.
Temperature — Classified as warm, cool, cold.
Relation to wind noted.
State of sky and precipitation noted.
Observations recorded on "Sunshine Chart" — fair day, orange disc of paper; cloudy day, gray disc; stormy day, black.
Relation to wind direction noted.
Moisture — Evaporation illustrated in various ways: Water placed near heat; clothes wrung out of water.
Condensation — Illustrated by breathing on pane; chilling water. Dew point found.
Rainfall — Shape and size of drops noted. Amount of precipitation measured.
Snow — Flakes studied. Crystallization of salt, sugar, etc., noted. Snowfall measured.

XIII. Page 42.

Pioneer life studied and compared with present.
Agriculture: Gardening — Vegetables grown under varying conditions. Gardens visited.
Grazing — A model dairy studied; care of cows and milk.
Lumbering: Lumber camp studied. Sawmill visited.
Mining, Quarrying: Mine and life of miner studied. Excursion to mine or quarry.

XIV. Page 47.

Transportation — Commerce: Freight depots, docks, warehouses, and steamers visited.

XV. Page 49.

Practical observations:
Shadow of vertical rod marked two hour before noon, at noon, etc.
The true north found.
Desks, etc., drawn to scale.
Other areas drawn to scale by teacher. The correct dimensions found by the pupils.

SUGGESTIVE QUESTIONS TO ACCOMPANY PART II

XVI. Page 53.

(1) If you were to start from your home and travel about the world eastward, what bodies of land and water would you pass over? (2) If you were to travel westward, what bodies of land and water would you cross? (3) Starting from your home in a northerly direction and traveling about the earth, what directions would you take? (4) What bodies of land and water would you cross? (5) Starting in a southerly direction and traveling about the earth, what bodies of land and water would you cross? (6) What oceans might we cross in traveling from North America to Eurasia? (7) Which one would you cross if you were going to Europe? (8) Which ones in going to Asia? (9) Name the bodies of water surrounding each continent. (10) In what direction is each continent from North America? (11) What continents are crossed by the equator? (12) Which of the continents is the warmest? (13) How do you know? (14) What line divides the earth into northern and southern hemispheres? (15) Could we divide the earth in any other way and still have northern and southern hemispheres? (16) What continents are in the western hemisphere? (17) If you were to cross the ocean to Europe, in which hemisphere would you be? (18) Name all the continents of that hemisphere. (19) Is there more land or more water on the surface of the earth? (20) Which hemisphere has the more land, the northern or the southern, the eastern or the western? (21) Look at the globe and see if you could divide the earth into land and water hemispheres. (22) How deep is most of the ocean? (23) Find out how deep the deepest spot is. (24) How high is the highest mountain in the world? (25) If the highest mountain could be placed in this deepest spot could you see any of it? (26) How can you tell from looking at your map that the bed of the ocean is irregular?

XVII. Page 55.

(1) Represent the forms of land and water on the sand table. (2) Make a series of drawings illustrating these forms.

XVIII. Page 59.

(1) Tell how the people in Mexico and Central America live. (2) Find out how coffee is raised. (3) Trace the routes on the map by which this product might reach us. (4) In what part of North America do the people of the cold countries live? (5) Find their homes on the map. (6) Tell all that you can about the life of these people. (7) Would you rather live in the Eskimos' country or in a warm country? Why? (8) Find out what animals live in northern North America, and of what value they are. (9) By what routes may their products be sent to us? (10) What kind of a climate has northern South America? How do the people live? (11) Describe the climate of southern South America. (12) What products do we get from South America? (13) Trace the routes by which they come. (14) Which is the largest continent? (15) How does the winter temperature compare with that of North America? (16) What product is sent us from northern Eurasia? (17) Describe the climate of southern Europe. (18) What products are grown there? (19) By what routes would you send wine from southern France to New York? (20) Cutlery from Sheffield, England, to New York? (21) From what part of Eurasia do we get tea and rice? (22) Trace the routes by which these products are sent to us. (23) Which is the smallest continent? (24) Name some of its products. (25) Where have we found the same products? (26) Tell all that you can about the climate of these two places. (27) Why is Africa sometimes called the "Dark Continent"? (28) Find out what you can about the people of Central Africa. (29) Name some of the animals that are found here. (30) What are some of the products of Africa? (31) Are they like the products of any other country which you have studied? (32) Compare the climates of the regions having similar products.

XIX. Page 66.

(1) Name the Heat Belts. (2) What part of North America is in the Cold Belt? (3) What part of Eurasia? (4) Name some people who

live in this region. (5) Where is the Hot Belt? (6) What part of Africa is in this belt? (7) What part of South America? (8) Name the other continents that are partly in this belt. (9) Where is the South Temperate Belt? (10) Which continents are partly in this belt? (11) Where is the North Temperate Belt? (12) In which belt do you live? (13) Notice the position of the sun in the morning: which window receives the sunlight? (14) Notice the position of the sun at noon. (15) When does the sun pass from the eastern to the western part of the sky? (16) Notice the position of the sun in the late afternoon. (17) Why does it grow dark at night and light in the morning? (18) How long does it take the earth to turn once on its axis? (19) Compare the amount of light received at noon with that received in the early morning; with that received in the evening. (20) Do we get more light when the sun is high in the sky or when it is low? (21) At which time do we get more heat? (22) Drive a rod into the ground so that it will stand vertically. Measure the length of the shadow cast by this rod at different times throughout the day. (23) Is the sun high or low in the sky when the shadow is short? (24) When it is long? (25) Try to judge of the time of day from the length of the shadow. (26) Does the sun always set exactly in the west? Watch it during the summer and the winter in order to find out about it. (27) Watch and find out whether it always rises in the east. (28) At what season is the sun most nearly overhead at noon? (29) When are the rays most slanting at noon? (30) Why are they so slanting at this time? (31) Draw a diagram of the earth and the sun in our winter; in our summer. (32) Why is it warmer in the summer than in the winter? (33) When we have spring what season has southern Africa?

SUGGESTIONS FOR COLLATERAL READING

The references given below have been carefully selected from all available supplementary volumes and are here presented because of their worth as collateral reading on the topics indicated. The references are given by chapters for convenience in use.

KEY TO ABBREVIATIONS

American Book Company (A. B. C.); D. Appleton & Company (Ap.); Cassell Publishing Company (C.); The Century Company (Cen.); DeWolfe, Fisk & Company (D. F. & Co.); E. P. Dutton & Company (D.); Educational Publishing Company (E. P. C.); A. Flanagan & Company (F.); Ginn & Company (G.); D. C. Heath & Company (H.); Lee & Shepard (L. & S.); The Morse Publishing Company (M.); Rand, McNally & Company (R. McN.); Charles Scribner's Sons (S.); Silver, Burdett & Company (S. B. C.).

I. Page 7.

Payne's *Geographical Nature Studies* (A. B. C.), Shelter, p. 98; Our Shelter, p. 100.

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), Homes of the Animals, p. 154; Our Homes, p. 160.

II. Page 9.

Payne's *Geographical Nature Studies* (A. B. C.), People Live Together, p. 137.

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), Something About a City, p. 209; The Country Store, p. 206.

IV. Page 14.

Payne's *Geographical Nature Studies* (A. B. C.), Government: Home, p. 140; School and Country, p. 142.

V. and VI. Pages 16 and 19.

Payne's *Geographical Nature Studies* (A. B. C.), Surface, p. 32; Slopes, p. 33; Valleys, p. 36; Divides, Hills, Mountains, Plateaus, p. 48.

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), The Surface of the Land, p. 91; Story of a Mountain, p. 104.

Long's *Home Geography* (A. B. C.), Plains, p. 31; Hills, Mountains, Valleys, p. 35.

VII., VIII., and IX. Pages 22, 26, and 29.

Frye's *Brooks and Brook Basins* (G.), At Work in the Dark Soil, p. 10; On the Water-Parting, p. 18; In the Brook-Bed, p. 27; Brook Basins and Systems, p. 36; Home to Old Ocean, p. 114.

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), Water Works for Us, p. 66; How the River Made the Valley, p. 84; The Summer Stream, p. 89; Something About Lakes, p. 108.

Long's *Home Geography* (A. B. C.), How Rivers are Made, p. 50; More About Rivers, p. 54; Work of Flowing Rivers, p. 59; Waterdrop's Story, p. 60.

Parker and Helm's *Uncle Robert's Geography, Book III.* (Ap.), A Day on the River, p. 135; The Walk After the Rain, p. 158.

Payne's *Geographical Nature Studies* (A. B. C.), The Sorting of Silt, p. 58; Work of the Streams, p. 61; Stream

Systems, p. 68; Water in the Ground, p. 71; Pools, Ponds, and Lakes, p. 76.

Andrews' *Stories Mother Nature Told Her Children* (G.), What the Frost Giants Did, p. 85.

X. Page 32.

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), The Soil, p. 15; How the Soil is Made, p. 18; What Plants Need, p. 25.

Frye's *Brooks and Brook Basins* (G.), How Soil is Made and Carried, p. 44.

XI. and XII. Pages 36 and 40.

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), Three Forms of Water, p. 39; Where the Water Comes From, p. 43; The Wind, p. 48; The Clouds, p. 52.

Long's *Home Geography* (A. B. C.), How Water is Changed to Vapor, p. 42; How Vapor is Changed to Water, p. 44; Dew, Clouds, Rain, p. 46.

Frye's *Brooks and Brook Basins* (G.), The Raindrops Set Out on Their Journey, p. 1; Forms of Water, p. 54; The Atmosphere in Motion, p. 61.

Payne's *Geographical Nature Studies* (A. B. C.), Water in the Air, p. 16; Getting Moisture From the Air, p. 19; Where the Rain Comes From, p. 22.

XIII. and XIV. Pages 42 and 47.

Payne's *Geographical Nature Studies* (A. B. C.), Farming, p. 102; Stock-Raising and Dairying, p. 105; Lumbering, p. 108; Mining, p. 111; Fishing, p. 113; Manufacturing, p. 114; Making Flour, p. 117; Making Cloth, p. 119; Making Iron and Steel, p. 122; The Occupations — Trade or Commerce, p. 124; Transportation by Land, p. 125; Transportation by Water, p. 127.

Andrews' *Stories Mother Nature Told Her Children* (G.), One of God's Storehouses, p. 125.

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), Occupations, p. 177; Trade and Commerce, p. 181; Hunting and Fishing, p. 185; Farming, p. 189; Stock-Raising, p. 194; Lumbering, p. 199; The Making of Sugar, p. 213; The Story of the Silk Worm, p. 221; Where Minerals are Found, p. 116; How People Used to Travel, p. 167; Traveling To-day, p. 171.

XV. Page 49.

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), What is a Map, p. 233.

Long's *Home Geography* (A. B. C.), How the Sun Shows Direction, p. 10; How the Stars Show Direction, p. 14; How the Compass Shows Direction, p. 15; Questions on Direction, p. 17; How to Tell Distance, p. 21; Pictures and Plans, p. 23; Exercise in Drawing Plans, p. 27.

XVI. and XVII. Pages 53 and 55.

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), The Ocean, p. 76; The Work of the Ocean, p. 80.

Long's *Home Geography* (A. B. C.), Forms of Land and Water, p. 73; More About Forms of Land and Water, p. 76; A Trip to the Highlands, p. 80.

XVIII. and XIX. Pages 59 and 66.

Andrews' *Seven Little Sisters* (G.), and *Each and All* (G.).

Carroll and Jerome's *Around the World*, Second Book, (M.).

Fairbanks' *Home Geography for Primary Grades* (E. P. C.), What is Climate, p. 93; What We Learned by Climbing a Mountain, p. 97; The Seasons, p. 29; How the Seasons Affect Plants and Animals, p. 34.

Miller's *Little People of Asia* (D.).

Schwatka's *Children of the Cold* (C.).

Shaw's *Big People and Little People of Other Lands* (A. B. C.).

Smith's *Eskimo Stories* (R. McN.), The Northland, p. 11; How the Eskimos Live, p. 16; The Walrus, p. 20; Seals, pp. 35 and 49; A Long Journey, p. 31; Icebergs, p. 37; The White Bear, p. 39; The Story of a Real Eskimo, p. 177.

Starr's *Strange Peoples* (H.).

Youth's Companion Series, *The Wide World* (G.).

Perdue and LaVictoire's *Child Life in Many Lands* (R. McN.), Hunting and Fishing, p. 45; Tea, p. 83.